THE DOCK & HARBOUR AUTHORITY

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Editorial Comments.

THE PORT OF MOMBASA.

In the issue of *The Dock and Harbour Authority* for January, 1928, we published an article on the Port of Mombasa which was devoted to the history of the port and also to the construction of berths Nos. 1 and 2. Since that date berths Nos. 3 and 4 have been completed, and the construction of berth No. 5 has been authorised and is now being proceeded with, and these three berths form the subject-matter for this month's supplement.

This article has been written by Mr. George Bulkeley, A.M.I.Mech.E., Port Manager, Kenya and Uganda Railways and Harbours, who also wrote the previous one.

SHIPPING, ENGINEERING, AND MACHINERY EXHIBITION.

This Exhibition, which opens on September 12th and closes on the 28th, will, we feel sure, prove of great interest to our readers, and with this purpose in view three pages of this issue have been devoted to the principal exhibits at the Exhibition which chiefly appertain to dock and harbour authorities, and we are certain that a visit to any of these stands will be worth while.

We shall be pleased to welcome any of our readers who care to visit us at our stand in the Gallery, and can assure them of a hearty welcome.

STORAGE OF TIMBER AT DOCKS.

Criticism of the methods of discharging timber cargoes at Liverpool was uttered at the annual meeting of the Liverpool Association of Chartered Shipbrokers. Mr. E. A. Behrend, F.I.C.S., who presided, said: " It is unfortunate, as far as shipbrokers are concerned, that shipping business throughout the world is continuing to develop more and more along the lines of regular and semi-regular services. This movement is making it increasingly difficult for tramp steamers to obtain profitable employment and has thus an adverse effect upon the business of chartering brokers. The port charges in Liverpool still remain very high, and many shipowners endeavour to place their tonnage in such a way as to avoid coming to the Mersey as much as possible. A great deal has been said about favourable dock arrangements and quay facilities being made in order to regain the timber trade for Liverpool which used to come to this port, but which has now for many years been diverted elsewhere. It cannot be too strongly emphasised," said Mr. Behrend, " that the present arrangement with regard to discharging wood cargoes in Liverpool is most unsatisfactory. Such cargoes are allowed to lie on the quay unprotected for weeks and even months, after being discharged. Receivers only render returns after having removed these cargoes to their yards, and frequently make heavy claims for shortage which, under the existing conditions of charter, they are in a position to deduct before paying the balance of freight. Under such circumstances it is not surprising that many owners have definitely stated they will not, under any circumstances, discharge timber cargoes in Liverpool on account of the fact that they never know what claims are being made for shortage, particularly as such claims are made long after the cargoes have been discharged.

NAVIGATION IN HUDSON STRAIT.

In view of the importance to shipping interests of all available information relative to ice conditions in Hudson Strait, consequent upon the recent completion of the Hudson Bay Railway and the construction of a new port at Churchill, Manitoba, the Canadian Government despatched an expedition to the Strait in July, 1927. The object of this expedition was to gather all data which could be obtained as to conditions likely to be met by vessels using the new route. The general plan of operation made provision for three bases, one at the east end of the Strait, one at the west end, and one half-way between these two. The expedition was provided with two Fokker aeroplanes, and with much other land and water equipments, and spent the whole of the winter and summer of 1927-28 in the Strait, returning to Quebec in November, 1928.

The report of the expedition contains recommendations as to charting and tidal survey, ice-breakers, fuel bases, etc., and concludes with the judgment that the measure of success to be achieved by the development of the new transportation route will depend very largely upon the extent to which the necessary safeguards to navigation, which have been made available since the war, are placed at the disposal of shipping interests using the new route.

Copies of the report can be obtained by shipping and business interests concerned on application to the High Commissioner of Canada, Canadian Building, Trafalgar Square, S.W.1, or to the Department of Marine and Fisheries, Ottawa, Canada.

BOMBAY PORT TRUST.

At a meeting of the Trustees of the Port of Bombay held on July 30th, 1929, sanction was accorded to the following items:

(1) The placing of an order with the Sleeper Control Officer, Eastern Group, for 12,000 broad gauge Sal sleepers, required for renewals, etc., on the Bombay Port Trust Railway, for delivery during 1930-31.

(2) Acceptance of the tender of Messrs. Shapurji Pallonji and Co. for the supply of 750 tons " Swastika " brand cement at Rs. 52-8-0 per ton, for construction work.

(3) An estimate amounting to Rs.7,660 for construction of two office buildings for the use of the docks staff posted at Nos. 10 and 17 open berths, Alexandra Dock.

A ten-years renewal of leases of Rent Roll Nos. 115 and 133 (458¾ sq. yds.), Masjid Low Level South, Elphinstone Estate, was granted at revised rates.

The Board also approved the rules framed in consultation with the Governing Body of the I.M.M.T.S. " Dufferin " for administration of the two Port Trust scholarships of Rs.100/- a month each, to be awarded for a period of 3 years in each case to selected cadets of the I.M.M.T.S. " Dufferin " on passing out with an " Extra " certificate. The object of the scholarships is to encourage Indian officers of the Mercantile Marine to qualify for appointment to the Bombay Pilot Service in future vacancies.

It was decided to reduce the shed rent for non-grain storage accommodation at the Grain Depot to Rs.5/- per square yard per annum, subject to the area taken up not being less than 250 lineal feet of shed and a yearly tenancy to be entered into terminable at six months' notice on either side.

OBITUARY.

It is with regret that we record the death on Saturday, August 10th, of Mr. Ernest Latimer, a director of the Manchester Ship Canal Company and formerly managing director of the undertaking. Mr. Latimer was one of the Company's staff as far back as 1888, and was accountant for two years before being appointed general superintendent. He was appointed managing director in 1916. Mr. Latimer was also a director of the Manchester Dry Dock Company, Ltd., Manchester Raw Cotton Company and the Manchester Cotton Association.

Belfast Harbour Notes.

The latest official report of shipping tonnage using the Port of Belfast shows a gratifying increase. The report, which was submitted by the Harbour Master (Captain McIntyre) at a meeting of the Commissioners, said that during the two weeks ending 4th August, 470 vessels arrived at the port as follows: Coastwise and cross-Channel, 430; foreign, 29; non-trading, 11. The total tonnage of vessels arriving from 1st January to 3rd August was: coastwise and cross-Channel, 1,478,654 tons, as against 1,343,796 in 1928, being an increase of 134,858 tons; foreign, 359,634 tons, compared with 352,040 tons, an increase of 7,594 tons; non-trading, 50,133 tons, against 44,176 tons, a rise of 5,957 tons. The totals were 1,888,421, compared with 1,740,012, an increase for the period of 148,409 tons.

The Board approved the recommendation of the Works Committee to accept the tender of Messrs. Workman, Clark and Co. (Belfast) to carry out repairs to No. 1 caisson at the Alexandra graving dock, the contract including dry-docking, painting and cleaning.

BELFAST AS AN AIRPORT.

Mr. R. E. Herdman, D.L., the chairman of the Belfast Harbour Board, cleared away a good deal of misconception when, at a meeting of the Board, he explained fully the exact position in connection with the proposal of National Flying Services, Ltd., to establish an aerodrome on reclaimed land of the Commissioners.

Mr. Herdman said that the reclamation of the land involved a considerable outlay of money, but although the land was comparatively flat the National Flying Services required the Board to spend an additional sum of £6,000 in surfacing, draining and fencing the ground and in constructing an additional roadway.

It had been stated in the Press that the Board were demanding a rental of £600 per annum for the land, and he wished to make it perfectly clear that the Board were really not asking for any rent, but merely for the ordinary interest and redemption charge on the capital sum of £6,000 which the Board were asked to spend for the benefit of National Flying Services in order to make the land suitable for their purposes.

The Board had treated the matter most sympathetically from the start and had gone to the utmost limit to which their powers permitted them to go. The Board did not propose to levy any landing fees for their own benefit, but were prepared to allow National Flying Services to collect and retain all landing fees on the understanding that such fees would be similar to those in operation at other public aerodromes, and that the aerodrome would be available to all parties desiring to make use of it, whether affiliated with or under the control of National Flying Services.

The general manager stated that it was proposed to grant National Flying Services the use of 60 acres for a period of ten years.

BELFAST TRADE.

The report just issued of the Belfast Harbour Board on the imports and exports dealt with during the first six months of the year gives many suggestive figures. The imports of coal for the period were 683,000 tons, as compared with 650,000 in the first half of 1928. True, it is only about a five per cent. increase, but it indicates an improvement in industry generally, and that is good for the port. Iron and steel, the raw material of the ship-building trade, also shows an increase, the total quantity of both brought in being, in round figures, 70,000 tons, compared with 60,000 tons.

On the other hand, flax, the raw material of the linen industry, fell to 8,728 tons, against 11,422 tons. Round timber imports showed a slight decline and deals a heavy one, the latter being down to 10,219 loads, compared with 20,000 loads. The fall is firstly explained by the fact that at the beginning of the year there were very large stocks on hand. There was a large increase in the imports of cement, the figures being 23,000 tons, against 16,000 tons. The imports of hemp came to 7,705 tons, as compared with 6,662 tons.

Wheat imports increased from 21,000 to 35,000 tons, while flour fell from 39,000 to 33,000. There was an increase in the imports of Indian corn from 102,000 to 117,000 tons. In butter there was a big advance in imports, while the exports of the same valuable food fell from 244 to 158 tons. In the six months 1,805 tons of margarine were brought into the port, a large increase, and 788 tons of condensed milk.

The cattle export totalled 42,181 head as compared with 36,580; sheep 14,309, against 2,422; and pigs 6,281 compared with 2,898; 3,436 tons of bacon were sent out of the country, a slight fall, and 1,659 tons of ham, a small decrease. There was a big fall in the export of potatoes, the figures for the first half of the year being 77,000 tons, compared with 106,000 tons. Poultry and egg exports kept up well, the figures being 2,874 tons of fowl and 10,954 tons of eggs—practically the same as during the first six months of 1928.

There was a rise in the exports of whisky from 1,933 tons to 2,066 tons, but the total was only about a sixth of what was sent out of the country before the war.

Scottish Harbour Notes.

HARBOUR DE-RATING POINT.

The Aberdeen, Newcastle, and Hull Steam Navigation Co., the Aberdeen Steam Navigation Co., the Coast Lines, and the North of Scotland and Orkney and Shetland Steam Navigation Co. wrote to the Aberdeen Harbour Board drawing attention to the provisions of the Rating and Valuation (Apportionment) Act, 1928, and the de-rating provisions of the Local Government (Scotland) Act, 1929, and stating that objection had been taken to de-rating the sheds let by the Commissioners to the companies subscribing the letter, on the ground that the let was not the let of a portion of a dock undertaking, as it did not include a let of any portion of the wharves. The Commissioners were asked in the letter to amend the existing leases by including the occupancy of the wharves opposite the sheds let to the companies.

The subscribers stated in the letter that the proposed amendment of the leases would merely put in writing an arrangement which has been in practice for a long number of years between the Commissioners and the companies, whereby the companies have had an exclusive use of the wharves opposite the sheds, subject always to the harbour master's discretion, to allocate the berths, if necessity arose, to other vessels, when the subscribers' vessels are not in occupancy. In practice, the letter further stated, the harbour master has only utilised them as a temporary mooring place for vessels on the way to other berths, and not for loading or discharging such vessels.

The committee recommend that the Commissioners should alter, as from Whit Sunday last, the existing leases of the sheds in the occupancy of the companies, to the effect of granting to the companies concerned a right of tenancy for the periods of their respective leases of harbour sheds, in the sites of the sheds, and in the wharves so far as lying between the sheds and the quay wall. The harbour master shall be entitled, as hitherto, if occasion in his opinion arises, to berth vessels not belonging to the companies concerned at any of these wharves.

GERMANS AND BRITISH SHIPYARDS.

It is learned on good authority that a German delegation from the German shipbuilding industry, whose mission is to try and discover why British industry has regained its supremacy, will make a tour of the British shipyards in the very near future.

The visit, it is stated, has been arranged under the joint auspices of the British section of the Metal Workers' International and the Engineering and Shipbuilding Trades' Federation, and both the Tyne and Clyde will be included in the tour.

On inquiring at the offices of the Federation (Glasgow Branch), whilst no information was available as to the exact date when the delegates are expected on the Clyde, nevertheless they confirmed the statement given out some time ago that a German delegation was expected shortly.

£160,000 NEW WHARF AT LEITH.

A new wharf constructed by the Leith Dock Commission in the Outer Harbour of Leith was formally inaugurated recently. It is built of concrete on what was practically waste ground, is 1,000-ft. long, and has three or four berths with deep water alongside.

The quay has been equipped with a large steel goods shed, in which all the latest devices are incorporated for speedy handling of cargo. The layout of the interior, together with excellent equipment, provides the maximum facilities for saving labour and time in loading, unloading and transporting goods from one part to another.

The work has involved an expenditure of £160,000. The shed is to be used for the accommodation of the General Steam Navigation Co., Ltd.

LEITH DOCK TRADE.

A substantial increase in both exports and imports was recorded at Leith Docks during the month of July, and it is anticipated that August will reveal similar results.

Cargo coal showed an increase of 62,765 tons over the previous year for July, the total amount this year being 144,910 tons. Increases were also reported in the exports of pig iron and oil.

With regard to imports, the total grain brought in to the port amounted to 26,472 tons, an increase of 15,955 tons. There were also increases in flour, meal and fruit, but decreases in sugar, oilcake, wood, flax, and eggs.

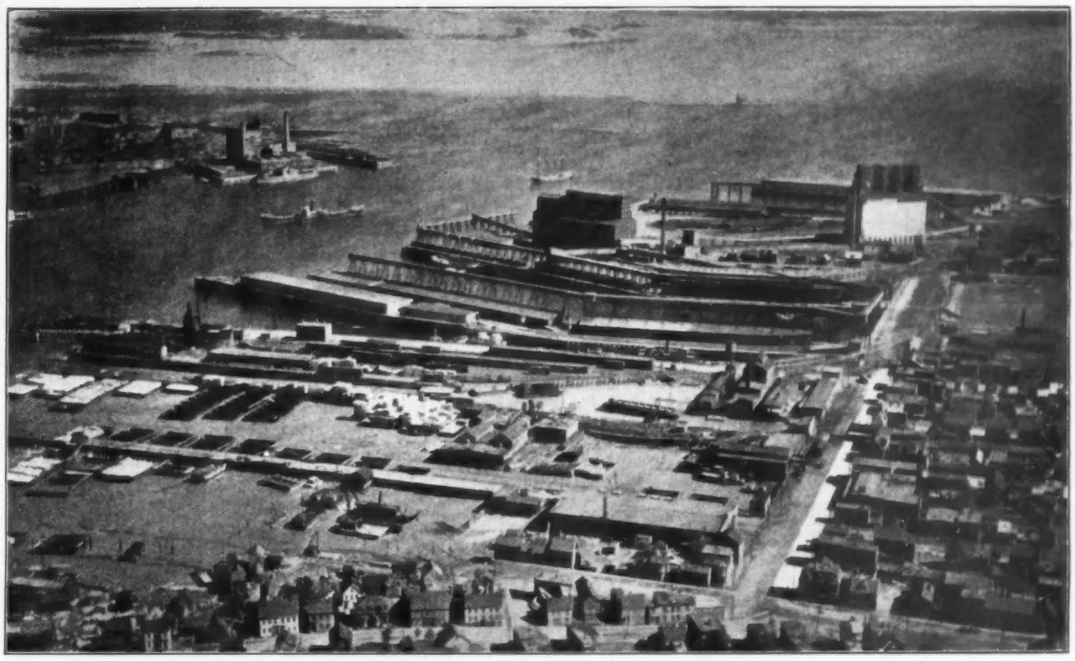
During July 540 vessels arrived at Leith, representing an aggregate of 202,061 tons, compared with 469 vessels and 170,959 tons in July last year.

EXTENSION OF THE GRAIN HARBOUR AT BREMEN.

A report of the Senate proposing an extension of the grain harbour and construction of further warehousing accommodation at Bremen has been agreed to by the Buergerschaft. It is estimated that this new construction will cost approximately Rm.4,000,000, which will include laying down of necessary road and rail extension, building of offices, and improvement of Pier II. The cost will be paid for over a number of years.

The Harbour of Saint John, New Brunswick.

Report of the Commissioners for the Years 1927 and 1928.



West Saint John, site of New Piers in foreground.

THE control of the harbour of Saint John was taken over by the Commissioners on August 1st, 1927. Previous to this date the operation of the port was under the dual control of the City of Saint John and the Department of Marine, and the Public Works of Canada carried out the necessary construction and maintenance work for the properties operated by the Department of Marine, in addition to performing necessary dredging and other assistance to the properties under the control of the City.

The City properties were taken over at a cost of $2,135,118.00 on August 1st, 1927, and comprise wharves and sheds situated on both sides of the harbour, in addition to such lands bordering on the harbour as were vested in the City. In taking over these properties, such of the operating and maintenance staff as the Commissioners considered necessary was retained.

These wharves and sheds, with their dimensions, are as follows:—

On the East, or City side, of the Harbour:—

	Floor Area of Shed. Sq. ft.
Reed's Point Wharf, 410-ft. long.	
New Pier Wharf, 380-ft. long	18,766
Pettingill Wharf, 400-ft. long	25,693
McLeod Wharf, 370-ft. long	22,704
On the West side of the Harbour:—	
Berth No. 1, 380-ft. long	28,928
Berth No. 2, 460-ft. long	29,638
Berth No. 3, 410-ft. long	22,791
Berth No. 4, 485-ft. long	25,293
Berth No. 5, 525-ft. long	30,099
Berth No. 6 and 6 Ext., 1,083-ft. long	50,382

On November 1st, 1927, the properties under the control of the Marine and Fisheries Department were taken over and the operation placed under the Board's staff. The wharves and sheds, with their dimensions, are as follows:—

On the West side of the Harbour:—	Floor Area of Shed. Sq. ft.
Berth No. 7 and 7 Ext., 1,055-ft. long	38,320
	8,720
Berth No. 14, 702-ft. long	10,094
	30,382
Berth No. 15, 865-ft. long	54,942
	47,347
Berth No. 16, 800-ft. long	68,721

All wharves are served with railroad sidings at the rear of the sheds, which facilitates the transfer of freight from vessel to railway.

Owing to the wharves and sheds taken over from the City being very old structures, and little maintenance having been performed on them in previous years, considerable expenditures were required to put them in first-class condition. The Government properties, being of a later type of construction and well maintained, required very much less expenditure.

Up to November 1st, 1928, the only deep-water wharf outside of the jurisdiction of the Commissioners was the Long Wharf, owned and operated by the Canadian National Railways. Satisfactory arrangements having been concluded with the Canadian National Railways as to the operation of this property, pending construction of a bridge to give them access to the west side piers, full control of same was placed under the Board's jurisdiction on the above date.

This pier is 545-ft. long, with two sheds, each 500-ft. long by 40-ft. in width, with railroad tracks on each face of pier and between the two sheds. The draft of water at both sides of the pier is 30-ft.

For the first year little or no change was made in the general operating policy formerly in force, it being felt that any changes to be made should receive consideration after the experience of at least one shipping season's operation.

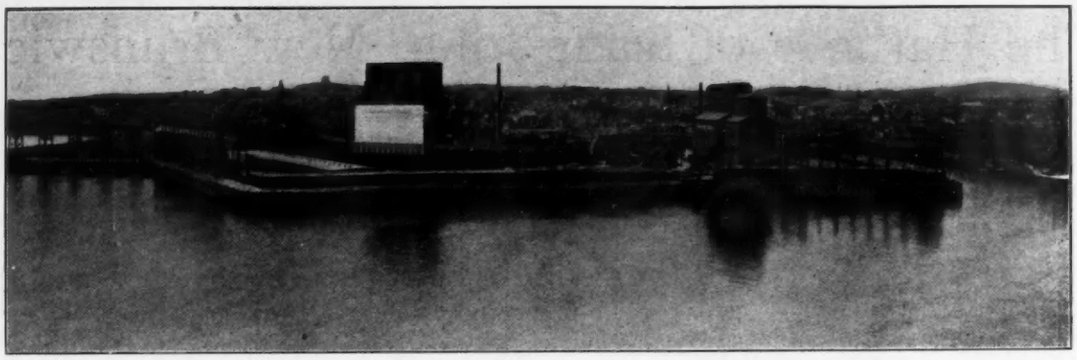
Advantage was taken of the experience of other Harbour Commissions in the operation of their ports, and in order that there would be uniformity, both in the operation and control of Saint John, with the other harbours under commission, by-laws for the collection of wharfage, etc., were adopted to conform, so far as practicable, with those of Montreal and Quebec.

GRAIN FACILITIES.

There has been a steady increase in the quantity of grain shipped annually. Up to 1915 there was only about seven and one-quarter million bushels shipped from the port, but with the construction of additional conveyor galleries at Berths 15 and 16 the amount gradually increased, the maximum grain shipments being during the season 1926-7, when 25,885,000 bushels were shipped.

Grain Conveyor Lengths:—	Feet.
Berths 1, 2, 3	1,530
Berths 5 and 6	2,251
Berth 15	1,210
Berth 16	1,160
	Bushels.
C.P.R. Elevators, West Saint John, "B" Concrete	1,000,000
"A" Wooden	600,000
	1,600,000
C.N.R. Elevator, East Side Harbour	500,000
Total	2,100,000

On account of the elevators, West Saint John, not being connected up so that grain could be shipped from any one



West Saint John, Berths 1, 14 and 15 and Elevators.

elevator over all the conveyor galleries, it was found necessary to erect a conveyor gallery between the two elevators, in order that grain could be transferred from one elevator to the other and from thence shipped over any conveyor gallery.

This work was carried out in the fall of 1927, at a cost of $55,000.00, and considerably facilitated the movement of grain through the port, as a vessel lying at any berth equipped with a conveyor gallery could receive grain from either elevator without the vessel having to be moved from her berth.

The bulk of the grain shipped through the port has been handled through the Canadian Pacific Railway Company's elevators, West Saint John. Elevator "A" is of modern concrete construction, while Elevator " B " is of older wood construction but in a good state of repair.

The Canadian National Railways' elevator on the east side of the harbour is a concrete structure, with conveyor galleries 1,560-ft. in length.

POTATO STORAGE FACILITIES.

In the fall of 1922, at the request of potato growers throughout the Province, a frost-proof warehouse 210-ft. long by 80-ft. wide was provided on Berth No. 14 for this business. After the first year's operation the business increased so that an extension of 94-ft. was made to the original shed. This latter extension, however, was not sufficient to meet the demands of the trade, and eventually, in the fall of 1925, another extension of 66-ft. was made to the buildings. The total floor frost-proof area now available for shipment of potatoes during the winter season is 40,000 square feet.

The maximum potato shipments from the port for a winter season amounted to 2,508,000 bushels in 1924-5. The storage capacity on the west side of the harbour is 31,000 barrels, and on the east side, New Pier Wharf, 15,000 barrels.

CATTLE SHIPPING FACILITIES.

Late in 1921 the shipment of cattle through the port was resumed, and for that purpose modern facilities were provided by the Dominion Government, the first shipment in that year having arrived on December 24th.

During 1922 and subsequent years up to 1925 the shipment of cattle increased from 2,464 head in 1922 to 31,218 head in 1925.

The cattle business increased so rapidly that the facilities available were very soon found to be inadequate, and during 1926 extensive additions to the cattle shed were constructed and equipped with every modern convenience, including weigh-scales, water supply, and roping and branding facilities. Unfortunately, after the improvements were completed the cattle business gradually dwindled, and no cattle have passed through the port for the past two years.

The main cattle shed had 35 pens capable of accommodating 20 head each, and the western extension 19 pens each accommodating 25 head and five pens accommodating 18 head, a total accommodation for 1,265 head of cattle. This accommodation has been materially reduced in order to provide for fertiliser storage.

FERTILISER STORAGE.

On account of the cattle exportation having disappeared and the gradually increasing importation of fertiliser, it was found necessary, in order to take care of this business, to dismantle the major portion of the cattle sheds and equip same for the reception and storage of fertiliser.

Owing to the long haul from the ship's side to the storage shed, three gasoline tractors and 20 trailers were purchased, in order to facilitate the discharging of the fertiliser cargo. This equipment is rented to the importer at a per ton charge.

ELECTRIC CRANE.

The lack of cranes for handling heavy lifts from and to vessels has caused considerable inconvenience to shipping companies; consequently, late in 1927, an electric crane of capacity of 40 tons at 80-ft. radius was installed at the end of No. 15 wharf. The crane is located so that lifts can be conveniently handled from holds of steamers directly on to railway cars on the wharf.

GENERAL REPAIRS.

All the harbour structures being constructed of wood, considerable renewals are required annually. These consist of renewing floors in sheds and platforms on face of wharves, in addition to replacement of decayed timbers in the wharves between low water and top of wharves.

In addition to ordinary repairs, the properties taken over from the City, particularly the substructures of wharves on the eastern side of the harbour, requiring practically full renewal from low water up. This work has been carried on in annual instalments, and it is anticipated that all structures will be in a state of good repair within two years.

The face of No. 1 wharf, which was completely destroyed in a heavy storm on January 25th, 1928, was renewed for a length of 112-ft. from low water up. The substructures of portions of Sheds 2 and 3 were also renewed from low water up.

The roof of Pettingill Shed, on the east side of the harbour and No. 14 shed, on the west side of the harbour, were completely renewed during 1928.

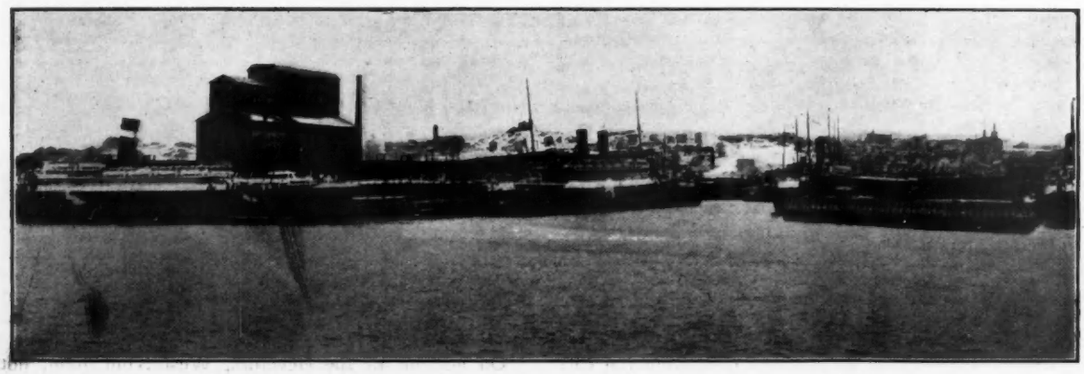
LIGHTING.

The entire lighting in the sheds taken over from the City, on both the east and west sides of the harbour, was completely renewed, and the amount of lighting supplied considerably increased. Sufficient lighting was also installed on the various wharves so that the harbour front property is adequately lighted for night work.

DREDGING.

DEEP WATER BERTHS.

Owing to the large amount of silt coming in on the flood tides and also brought down the river during freshet, considerable dredging has to be performed annually. The experience has been that each berth silts up from 2-ft. to 4ft. in the course of two years, and it has been found necessary



West Saint John, Berths 1, 2, 3, 4, 5, 6.

to have each berth dredged at least once every two years. The amount of dredging per annum averages about 50,000 cubic yards.

CHANNEL ENTRANCE.

While considerable dredging is required in the various berths, the experience is that there is no filling in in the channel entrance, which maintains a depth of 30-ft. below low water for its full length.

NEW FACILITIES.

The facilities taken over by the Commissioners were totally inadequate to handle the amount of business offering the port. Consequently the first work undertaken was a complete study of the requirements of the trade, and plans were prepared with a view to developing the port to the fullest extent. The plans prepared provide for facilities for ocean tonnage sufficient to double the present capacity. These were approved, and authority was given by Parliament to proceed with the scheme prepared, and an initial expenditure of $5,000,000.00 was voted in the Session of 1927-8.

Tenders were called during the summer, and in August, 1928, work was commenced on the construction of a pier 800-ft. long by 300-ft. wide, and also on the construction of a grain elevator of one-and-a-half million bushels capacity. The necessary land for trackage purposes, etc., is being purchased, and the completion of the works now under construction will complete the first unit of the final scheme.

The site selected for the works is between Berth No. 7 and Navy Island. This site was selected on account of its sheltered position, no protection by breakwaters being required. It will be easily accessible to both railways, the Canadian National Railways by a bridge across the harbour at Navy Island, and the Canadian Pacific Railway by an extension of their present tracks.

The full scheme contemplates the construction of two piers, each 1,250-ft. in length by 300-ft. wide, and one quay wall 1,250-ft. in length. The width of the berth between the piers is 400-ft. at the outer end, converging to 300-ft. at the inner end, the draft of water being 35-ft. below extreme low water. The piers will be of reinforced concrete caisson construction up to 6-ft. above low water, the caisson being filled with rock, and from top of concrete caisson the construction will be timber cribwork. The piers and quay wall are to be equipped with modern fireproof warehouses and grain conveyor galleries on each pier.

It is proposed to fill in the area behind the quay wall and connect same with Navy Island, so that sufficient space may be provided for industrial and other purposes. In order that adequate railway facilities may be provided to serve the piers, the whole water front area of West Saint John to the east of Market Place will be acquired. This includes the filling in of the property known as the " Mill Pond " and the taking over of the ferry property now operated by the City of Saint John, in addition to the Shore Line Railway premises of the Canadian Pacific Railway Company.

On the area to be acquired for trackage a strip of land along Market Place, for the full length, will be reserved for industrial purposes.

The pier at present under construction, on which considerable progress has been made in excavation for the foundation, is to the north of the pier to be erected on the ferry property. On account of considerable rock excavation, this work is being carried out within a cofferdam surrounding the whole work.

ELEVATOR.

The proposed elevator will have a capacity of three million bushels and is to be equipped with the latest equipment for the handling of grain, both receiving and discharging. The elevator work at present under construction will provide for one-and-a-half million bushels capacity, provision being made for further extension to three millions when required.

It is proposed to connect up the new elevator system with the existing elevators, so that a vessel at any berth in the harbour may receive grain from either elevator.

Good progress has been made in the works under contract, and it is fully anticipated that they will be available for use by January 1st, 1931.

TONNAGE.

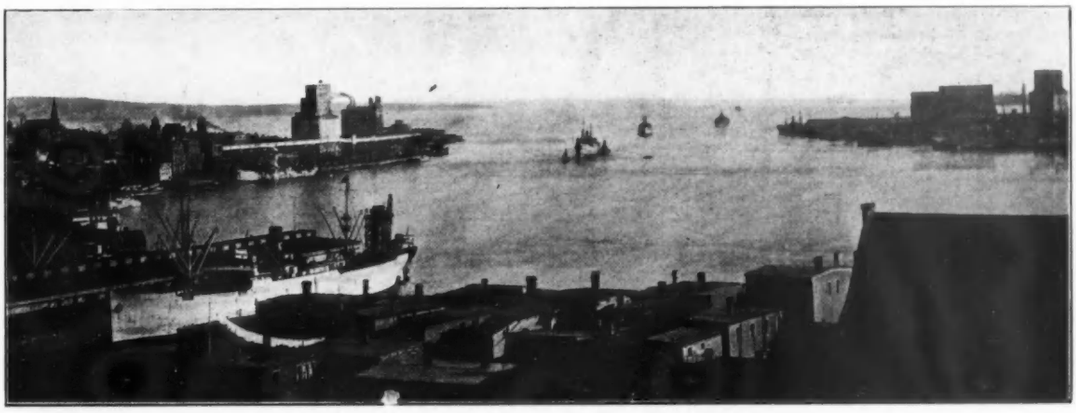
Statement showing the nationalities and net tonnage of seagoing vessels that arrived in the port of Saint John during the year 1928:—

Nationality.	No. of Vessels.	Tonnage.
American	64	148,361
British	192	751,823
Danish	19	25,990
Dutch	4	4,706
French	1	2,546
German	9	19,771
Greek	1	1,941
Italian	26	89,117
Norwegian	81	123,711
Swedish	13	14,784
	410	1,182,750

FINANCE.

The profit and loss account for the five months ended December 31st, 1927, showed an operating income of $34,442.70. Operating expenses were $70,689.05, administration expenses $15,467.73, and interest $41,947.92, showing a net loss for the five months of $93,662.00.

The profit and loss account for the twelve months ended December 31st, 1928, showed an operating income of $304,181.45. Operating expenses amounted to $115,892.87, administration expenses $27,858.12, and interest $100,031.65, showing a net profit for the twelve months of $60,308.81.



Saint John Harbour Entrance.

ANOTHER SILK FACTORY FOR CANADA.

The Gotham Silk Hosiery Company, of New York, contemplates the erection at St. Hyacinthe, Quebec, of a factory for the manufacture of silk hosiery.

Applications have been made to the City Council for a permit to erect the proposed plant, coupled with a request for a 75 per cent. tax exemption for ten years. If these conditions are secured, the Company proposes to build a plant costing $300,000, which will be ready to operate in November and will employ 300 persons at the start, the number later being increased to 1,000.

NEW LOADING FACILITIES IN BREMEN FREE HARBOUR NO. 2.

New crane installations in front of Sheds 15 and 17 in Free Harbour No. 2 at Bremen have recently been constructed. A long row of 24 high half-truck revolving and whip cranes has been erected in front of the new sheds in Harbour 2. Like the sheds, these are being constructed by the Maschinenfabrik Augsburg-Nuernberg (M.A.N.) according to the latest principles. Twelve further cranes being built in Bremen will be added. The carriages of these electrical cranes are easily movable to all sides. They each have three-tons carrying capacity, 19 to 7 metres discharge, and up to 33 metres elevation. They render possible considerable economy in electric current, time, and space, and can be used in numbers to load various hatches of a vessel at one and the same time without hindering each other. The new Sheds 15 and 17 are intended chiefly for cotton traffic and erected on that portion of the quay from which the new Lloyd express steamer " Bremen " started its trip down the Weser. The sheds have the enormous length of 396 metres and 384 metres respectively, and both have a depth of 66 metres. The sheds can be opened at any desired point facing the water by means of easily moving spring steel plate doors.

Notes from the North.

NEW COAL-CONVEYING PLANT FOR BIRKENHEAD.

Mersey Docks and Harbour Board, at their meeting on August 15th, considered a proposal of the Works Committee for the erection of a new coal-conveying plant, together with the necessary railway connections at the south side of the West Float, Birkenhead, at a total estimated cost of £40,231; also that the offer of Messrs. Stothert and Pitt, Ltd., to carry out the construction, delivery and erection of the conveyor and machinery should be accepted. It was stated that the new conveyor would be capable of dealing with 500 tons per hour at a height of 75-ft. and would be able to deal with wagons of 30 tons gross. In conformity with standing orders, confirmation of the recommendation was postponed to the following meeting of the Board.

Mr. Walter Harding, managing director of Messrs. James Moss and Co., owners of the Moss Line Steamship Co., has been elected a member of the Mersey Docks and Harbour Board to fill the vacancy created by the resignation some weeks ago of Mr. A. B. Cauty, manager of the White Star Line, who removed to London. Mr. Harding is chairman of the Liverpool Steamship Owners' Association and vice-chairman of the Employers' Association of the Port of Liverpool.

BETTER PROVISION FOR TIMBER TRADE.

Strenuous efforts are being put forward at Liverpool to regain some of the timber traffic that has been lost to the port. Better provision is being made for timber cargoes at the Garston Docks of the London, Midland and Scottish Railway Company, and work is also proceeding to equip a section of Carriers Dock for the expeditious handling of bulk cargoes of timber. Carriers Dock has been rather quiet in recent years, and the improvements that are now being carried out should do much to restore it to its erstwhile busy aspect. Up to date cargo handling plant is to be installed.

In view of the extension of the Liverpool Dock Estate northward and the smaller number of craft using the central docks, there is, in some quarters, a tendency to speculate on the future of some of the less used harbourages. No doubt the utilisation of Clarence Dock as the site for the new Liverpool Corporation Power Station has encouraged this line of thought, but here there is a special circumstance. Clarence Dock is very central to the main power load, and the Corporation, as the owners of the electric supply undertaking, which is rapidly developing, naturally wanted a riverside site because of the availability of a requisite supply of cooling water.

WYRE LIGHT INCIDENT.

Had it not been for the prompt action of two lighthouse attendants, there was imminent risk of fire a few days ago when an electric switchbox on the Wyre Light, which marks the entrance to the Fleetwood Channel, suddenly fused. The two men in charge of the lighthouse immediately switched off the current, and very little damage was done. But for this, a fire might have broken out and extensive damage done, as a large quantity of petrol and other inflammables are stored in the lighthouse. Two of the L.M.S. Railway Co.'s electricians went out to the light in the harbour tug " Fylde " and remedied the defects.

IMPROVING PIERHEAD.

The Liverpool City Council has approved of a resolution that competitive designs be invited from architects and others for a scheme embracing the improvement of the whole of the amenities of the Liverpool Pierhead, and that premiums of 500 guineas and 250 guineas be offered for the first two schemes considered best in order of merit, and that the details in connection with the preparation of the necessary conditions, instructions and particulars for the competition be referred to the Finance Committee to deal with. The consideration of the proposed scheme was automatically adjourned to the September meeting of the Council.

FLEETWOOD DOCK WORKS.

In connection with the extensive dock works that are being carried out at Fleetwood Dock, the general contractors being Thomas Wrigby, Ltd., 26, Corn Exchange Buildings, Manchester, the following sub-contracts have been let by the L.M.S. Co. for the extension of the fish stages:—Carpenter and joiner, Eli Taylor and Co., Ltd., Ebor Saw Mills, Littleborough; steelwork, John Booth and Sons, Ltd., Hulton Steelworks, Bolton; plumber, A. Tinker, Stocks House, Cheetham; painter, A. Sharrocks, 93, Edenfield Road, Rochdale; Wolverhampton patent corrugated roofings, Messrs. Weston and Co. (Manchester) Ltd., 49, Bridge Street, Manchester.

WORK AT CLARENCE DOCK.

Since the Clarence Dock site was transferred to the Liverpool Corporation four months ago, the sheds on the estate as far as required for the erection of the station at this stage have been demolished. The dock has been drained and the bottom has been found to be very hard and highly suitable for the foundations of the power station buildings to be erected on it. Tenders have been accepted for the first 50,000 kw. turbo-alternator and also for the turbine house crane. Specifications have been prepared and issued for the buildings, civil engineering works, boiler plant and coal-conveying plant required, and the building work is about to be commenced and will be completed in time for the operation of the first part of the station at the end of 1930 or the beginning of 1931.

The Clarence Dock Power Station Committee of the Corporation propose to apply to the Electricity Commissioners for sanction to borrow £35,700 in respect of engineering fees. Amongst the tenders accepted are: Messrs. Francis Morton and Co., Garston, as main contractors for the construction of buildings, including structural steel work at a sum of approximately £198,932; Messrs. Babcock and Wilcox, Ltd., London, for the supply and erection of four boiler units, with auxiliaries, for the sum of £246,550; and Messrs. William Moss and Sons, Ltd., Liverpool, for the construction of reinforced concrete work (direct contract) for the sum of £74,596.

SAVING THE MERSEY FORESHORE.

To stop coast erosion at Blundellsands on the River Mersey, a new scheme is engaging attention. The erosion is going on at the rate of several yards a year, and although there has been much talk of schemes, their advocates have been deterred by the prospect of costs, ranging between £20,000 and £140,000. Mr. T. Mellard Reade, surveyor to the Blundellsands Estate Company, states that for a long time the River Alt, which enters the sea at Blundellsands, has been changing its course and working down the coast towards the south, all the time cutting into the coast. There have been a number of schemes for cutting a new channel for the Alt through the sandbank which now diverts it along the coast and thus making it a more direct outlet. These often involved a great deal of permanent work of an expensive nature, and there has always been the uncertainty with regard to the effect. His idea was now to cut a new channel for the Alt through the sandbank by means of a series of explosions. Experiments in that direction have already been made.

MANCHESTER SHIP CANAL TRAFFIC.

The monthly traffic return of the Manchester Ship Canal Company records that, during the month of July, traffic receipts amounted to £113,173, which is an improvement on July of 1928 of £413. In the aggregate figures for the first seven months of the current year, revenue touched £858,342, as against £841,785 for the first seven months of 1928. That there should be an increase of £16,557 at a time when trade is none too good is regarded as a happy augury. The labour dispute in the textile industry is, however, likely to have an unfortunate effect on the August return.

NEW BRIGHTON PIER.

Every endeavour was made by Wallasey Corporation to complete the reconstruction of the New Brighton Promenade Pier before the end of July in time for the August Bank Holiday. The work, however, was held up for various reasons, chiefly because of the non-delivery—through the shipping strike in Australia—of special timber required for the decking. This work is now being rapidly completed, but the Works Committee has been obliged to decide that the formal opening must be deferred until the beginning of next season.

FLEETWOOD DOCK SOUVENIR.

An interesting souvenir, over half a century old, has just come into the possession of the chairman of the Fleetwood Council. A few days ago, while holidaying at Brighton, a friend of his became acquainted with a Mr. Ellwell, who was one of the engineers engaged in the construction of Wyre Dock, Fleetwood, in 1876 and 1877. Mr. Elwell had one of the silver medallions which were struck to celebrate the opening of the first dock at the Wyre Port in October, 1877, and this eventually reached the Fleetwood civic chief. Only fifty of the medals were made.

VISITORS FROM NIGERIA.

Liverpool has received a visit from ten inspectors of the Nigerian Government who came to study the unloading and sampling of cocoa, palm kernels, palm oil, etc., from Nigeria. At a luncheon on board the liner " Abinsi " in Toxteth Dock, Mr. S. D. Grundy said the exchange of views between agricultural officer, produce inspector and those responsible for the handling, selling and manufacture of the raw materials, could not fail to be of the utmost benefit to all concerned. It might be worthy of consideration whether it would not be advisable for those interested to arrange for any leaders of African thought concerned in the improvement of agriculture in West Africa, to visit Liverpool. The opening up of new channels of trade between West Africa and other parts of the Empire was a work not less important than the development of agricultural science in West Africa.

Recent Legal Decisions.

Under the regulations of the Port of London Authority "The expression 'under way' when used in relation to a vessel means when she is not at anchor, or moored, or made fast to the shore, or aground, and includes a vessel dropping up or down the river with her anchor on the ground"; and by By-law 28: "In fog, mist, falling snow or heavy rain storms, whether by day or night, the signals described in this By-law shall be used as follows, viz.: . . . (e) A steam vessel under way about to turn, and whilst turning round, shall sound at intervals of not more than two minutes four short blasts in rapid succession, followed, if turning with her head to starboard, by one short blast, and, if with her head to port, by two short blasts . . ." The plaintiffs' vessel, *The Palembang*, while proceeding up Sea Reach, River Thames, in foggy weather, determined to come to anchor. Her whistle accordingly sounded a turning signal of four short blasts, followed by two short blasts, and her helm was put hard-a-starboard to turn head to the flood tide. Her engines, which had previously been stopped for some minutes, were then put full speed astern, and when the vessel had swung two or three points her anchor was let go, and as soon as the anchor was reported to be holding and the cable was taut, the vessel's "under way" lights were replaced by riding lights and her bell began to be rung. In these circumstances the defendant's vessel, bound up-river, came into collision with her. It was contended for the defendants (inter alia) that until she had finally swung to her anchor, head to tide, the plaintiffs' vessel was to be deemed to be a vessel "under way" within the meaning of By-law 5, and should have continued to sound the turning signals required by By-law 28 (e). It was held, however, that from the moment when she became actually held by and under the control of her anchor and while she so remained held by and under the control of her anchor, the plaintiffs' vessel was not a vessel under way but a vessel at anchor within the meaning of the By-laws. She was therefore no longer under any duty to sound the turning signals required by By-law 28 (e), but was bound to ring her bell in compliance with By-law 28 (h) and at night to take in her navigation lights and exhibit riding lights as prescribed by By-law 14.

In connection with the storage or warehousing of oil or other volatile commodities in harbour warehouses, it may be useful to note that the House of Lords have affirmed the judgment of the Court of Appeal in *Phoenix Insurance Company v. de Monchy*, 45 T.L.R. 543. Here we need only briefly state the facts of the case. The plaintiffs had an interest in a certificate of insurance on oil, which certificate had been issued under what were described as policies of insurance subscribed by the defendants. The policies provided for payment under certain conditions of loss due to leakage—which loss had occurred and was being claimed for in this action. The policies further contained a condition that no claim under them could be maintained unless brought within a year, but in the certificate there was no such condition. The action was brought on the certificate, but not within the year. It was held that, as the contract was to pay for loss and as the certificate was the actual insurance, and the clause as to the limitation of time could not be read into it, the plaintiffs were entitled to recover. Stated otherwise, the limitation as to time was not incorporated by reference into the certificate, and thus did not become a condition of the contract, which was made on the certificate. The reference to the policies only incorporated such clauses of them as were essential to the contract of marine insurance. To quote Lord Dunedin: "The condition as to time is a collateral stipulation imposing a condition precedent, it has nothing to do with insurance particularly might apply to any contract. Commonsense and fairness revolt against the idea of thus being enforced against the holder or endorsee of the certificate. Neither the holder as here nor a possible endorsee could ever have seen the policy. Against them it may be fair to assume ordinary insurance clauses, but not to assume a collateral agreement of this sort."

The paintiffs' steamship, *The Hayle*, sustained damage while lying aground in a berth in the harbour of the defendant railway company. Before the arrival of the vessel in the said berth certain correspondence had taken place between the plaintiffs and the defendants' harbour master as to the condition of the berths in the harbour, and the plaintiffs had received an assurance from the harbour master that the berth in question was suitable for their vessel to lie aground. It was found by the Court that the berth was, in fact, defective and unsafe, and that the damage complained of resulted therefrom. The harbour master had, in fact, acted as ship's agent for certain purposes, and the defendants therefore relied upon the knowledge of the harbour master of the unfitness of the berth, and also upon a printed notice of the terms of user of the berth. There was no evidence that this printed notice had ever been brought to the attention of the plaintiffs, but the defendants contended that the knowledge of the harbour master, as agent, must be deemed to be the knowledge of the principal. But it was decided (Bateson J.) that even assuming that the harbour master knew of the defective condition of the berth, his knowledge was not knowledge acquired in the course of his agency, which was limited to reporting the ship at the Custom House, paying the pilot, and providing the master with money to pay for labourers, and did not begin until the ship reached the berth; that as it was not in the interest of the harbour master to disclose the condition of the berth (assuming that he knew it) or the terms of the notice, and he did not in fact disclose either to the plaintiffs, his knowledge of those matters ought not to be imputed to his principals; and that the terms of the printed notice were contradicted by the assurance of the safety of the berth given by the harbour master before the ship arrived, and were no part of the contract between the parties.

Notes from German Ports.

KUSTEN CANAL.

The old lock at Moslesfehn has been removed during the last few weeks. This had been left until recently with the idea that it might assist in preventing dyke erosions; however, it has been found necessary to remove the lock.

The canal from Woebken-Hundsmuehlen to Oldenburg, which is complete, is above the level of the surrounding country. Vessels of 10-metre beam and a considerable draft can pass the first part of the canal. It is anticipated that a considerably larger amount of traffic will now use the canal.

FORMATION OF HAMBURG-PRUSSIAN PORT DEVELOPMENT COMPANY.

As a result of the recent agreement between the State of Hamburg and Prussia a Joint Company (the Hamburgische-Prussische Hafengemeinschaft m.b.H.) with headquarters at Hamburg, has been formed with a capital of 70 million marks. Prussia's contribution to the Company is composed of equipment, land, interests and rights, estimated at 35 million marks, whereas the State of Hamburg will contribute similar property and interests estimated at 5 million marks.

HAMBURG SHIPPING TRAFFIC IN JULY, 1929.

According to a report received by the Department of Overseas Trade from His Majesty's Consul-General at Hamburg, there was little change in the tonnage entered at the port in July as compared with June. The total tonnage cleared declined 50,000 tons, but the tonnage cleared with cargo was approximately the same as in the previous month.

British shipping in July amounted to 214 vessels (338,326 tons) entered and 216 vessels (371,225 tons) cleared, compared with 225 vessels (391,790 tons) entered and 224 vessels (386,709 tons) cleared in June.

German tonnage in July amounted to 892,400 tons entered (861,113 tons in June) and 860,361 tons cleared (842,303 tons in June).

Personal enquiries regarding shipping and transport matters should be made at the City office of the Department (Shipping and Transport Section), 73, Basinghall Street, London, E.C.2.

BREMEN SEA TRAFFIC IN JULY, 1929.

During the first seven months of the current year deep-sea shipping traffic exceeded, with 5,136,459 net registered tons, the same period in 1928 by 55,527 net registered tons. The quantity of goods imported increased as a result of larger grain importation from 362,500 tons in the previous month to 435,400 tons; this is 14,400 tons less than in July, 1928. Exports amounted to 202,800 tons, 11,400 tons less than in July, 1928.

The total traffic in the Weser Ports during July was as follows:—Incoming: Vessels 718, 762,765 net registered tons. Outgoing: Vessels 733, 768,616 net registered tons.

WESER SHIPPING IN JULY, 1929.

Water conditions on the Weser were still more unfavourable, as the depth of water continued to sink with short intervals, and vessels crossing from the canal to the Weser at Minden had, on that account, to be lightened still more than in June. On the Upper Weser, barges could, for the most part, only be loaded to half their capacity.

As a result, goods traffic in the valley also remained less. Traffic through the Bremen Weser lock, with 173,000 tons, was about 9,600 tons less than in June. Coal transport, which amounted to 57,900 tons in the previous month and therewith easily exceeded the import by sea of English coals, fell off to 51,000 tons. Coal imports from England, on the other hand, increased to 64,900 tons. Gravel and stone transport decreased by 8,400, while potash and salt increased by 3,500 tons. Upper Weser traffic, with 62,606 tons, was 20,000 greater, due to large transhipment of grain (13,800 tons more). Transport of timber also increased (3,200 tons more). In addition, a few thousand tons of English coals arrived in the Upper Weser for freightage.

The Port of Mombasa.

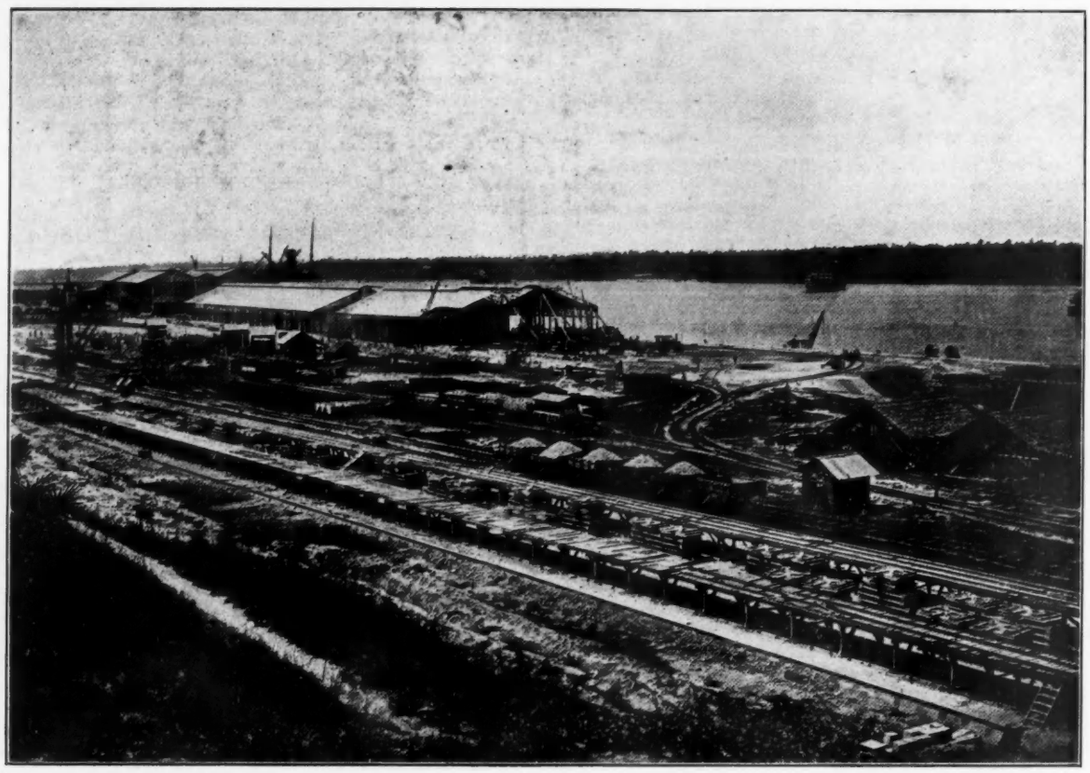


Fig. 1. Kilindini Harbour Works. General view of sheds under construction on Berths, Nos. 3 and 4.

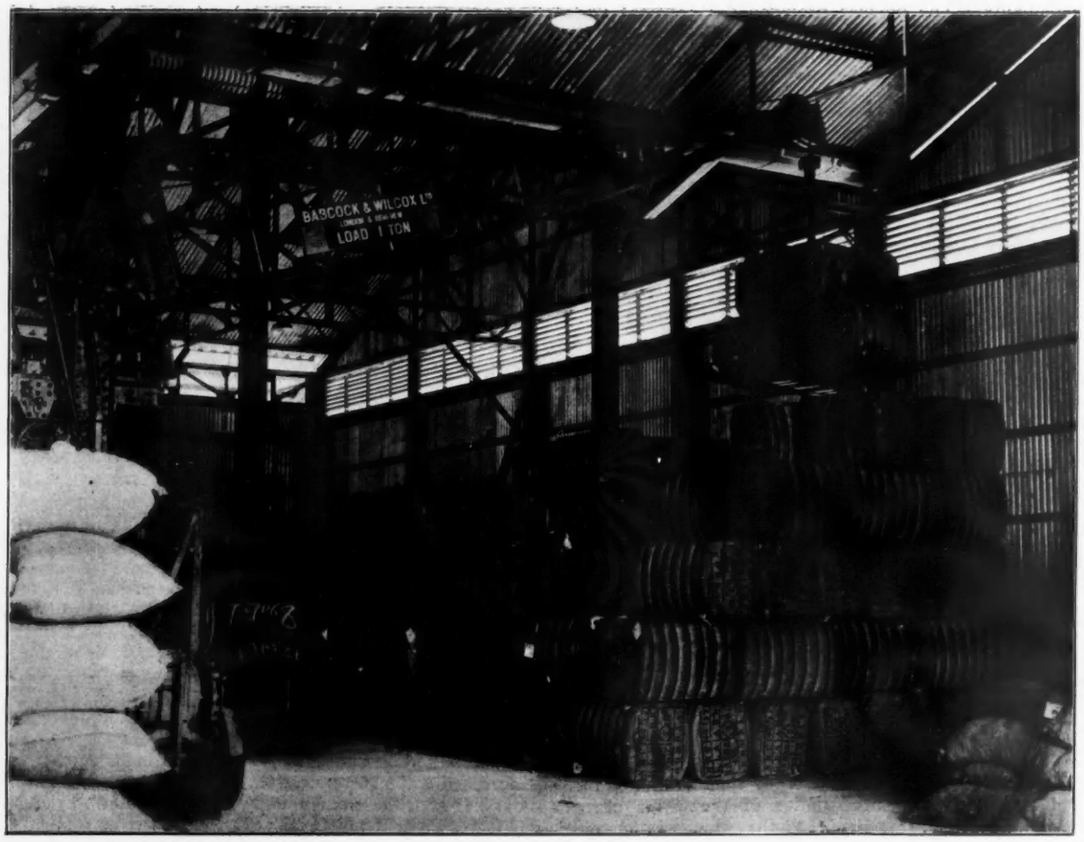


Fig. 4. One-ton Monorail Electric Walking-jib Crane stacking cotton bales in transit shed at Kilindini Harbour.

Further Developments at the Port of Mombasa.

By GEORGE BULKELEY, A.M.I.Mech.E. (Port Manager, Kenya and Uganda Railways and Harbours).

IN the issue of *The Dock and Harbour Authority* for January, 1928, a brief historical outline of the port of Mombasa was given, together with a description of the first increment of the port development programme which was being carried out there. A small plan of Mombasa Island was included in the article referred to; together with a scale drawing showing the layout and construction of deep-water quay berths Nos. 1 and 2, and a series of illustrative photographs.

Since January, 1928, deep-water quay berths Nos. 3 and 4 have been completed, together with their transit sheds and rail-track layout. Berth No. 5 and also a jetty at Shimanzi for dealing with bulk oils have been authorised by the Secretary of State for the Colonies, and are now under construction. The present article proposes to describe and illustrate this further extension.

Fig. 2. Three and Five-ton Electric Level Luffing Quay Cranes under erection at Kilindini Harbour.

The small plan of Mombasa Island which illustrated the previous article is reproduced on the Supplement in order to orientate the detailed layout shown in the large plan of the berths. It should be borne in mind in this connection that seven deep-water quay berths, with their transit sheds, rail tracks, and roadways, is the maximum number which can be constructed along the present alignment. Any further deep-water quay and deep-water jetty extension will have to extend southwards of the point of land (Ras Kilindini) from which the present deep-water quay is now proceeding in a northerly direction.

The Mombasa Island shore of Kilindini Harbour has been admirably aligned by nature for extensive harbour works, and the consulting engineers—Messrs. Coode, Wilson, Mitchell and Vaughan Lee—have been able to prepare a scheme which would include 23 deep-water alongside berths, without leaving the island shore of the harbour. Progressive expansion of trade in East African territories served by the port of Mombasa can therefore be adequately met by corresponding port facilities. This, together with the ready access direct from the Indian Ocean for ships of any size and draft at all states of tide and weather, places Mombasa in the front rank of world ports whose natural formation offers to shipping maximum advantages and imposes no handicaps.

The Supplement accompanying this article shows existing deep-water quay berths Nos. 1, 2, 3, and 4; also, in red, berth No. 5, now under construction.

Fig. 3. One-ton Monorail Electric Walking-jib Shed Cranes for Kilindini Harbour, shown luffing up in maker's workshop.

The basis of any new quay or jetty layout must be largely governed by the rail track facilities which are required to be provided, as minimum track curvatures and available inshore space govern these. The present deep-water quay alignment at Kilindini Harbour, Mombasa, has been planned on a basis of independent shunting access to each quay berth. Those who have been charged with the responsibility for prompt shunting movements, together with continuous working of ships, at old ports where quays half-a-mile in length have rail track access at either end only, will appreciate the very great advantages which accrue from independent rail-track access to each quay-face berth in a long line of quay with a ship lying alongside every berth. The other fundamental principle on which the rail-track layout at Kilindini Harbour is being built up is the provision of an adequate and easily shunted group of classification sidings back of the transit sheds at what will be the centre of the completed seven-berth quay. A great deal of care has been given to the exact planning of the rail connections at the north and south ends of this siding group, so as to provide for free access and egress in all necessary directions, without occupying time and space in wasteful traverses and avoidable back shunts. At the south end of this siding group, therefore, where both seaward and landward access is required, the sidings have been made balloon-ended; while at their north end, where seaward access only is required, a modified ladder end has been laid down, which also allows of ready access to the weighbridge loop from both the siding group and from the stacking ground sidings behind No. 5 shed. The same weighbridge loop is also fed from its

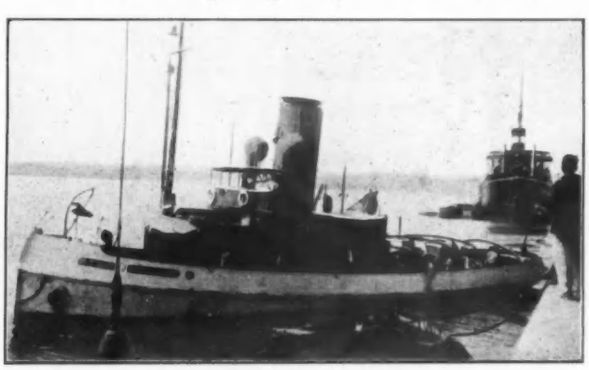


Fig. 6. Twin-screw 1,200 h.p. Steam Tug "Marie Felling," built for the Port of Mombasa, by Messrs. Earle's Shipbuilding and Engineering Co., Ltd.

southern end relative to the stacking grounds behind sheds Nos. 1 and 2. A direct rail connection from the south end of the siding group connects this with the running line (Beach

The Port of Mombasa.

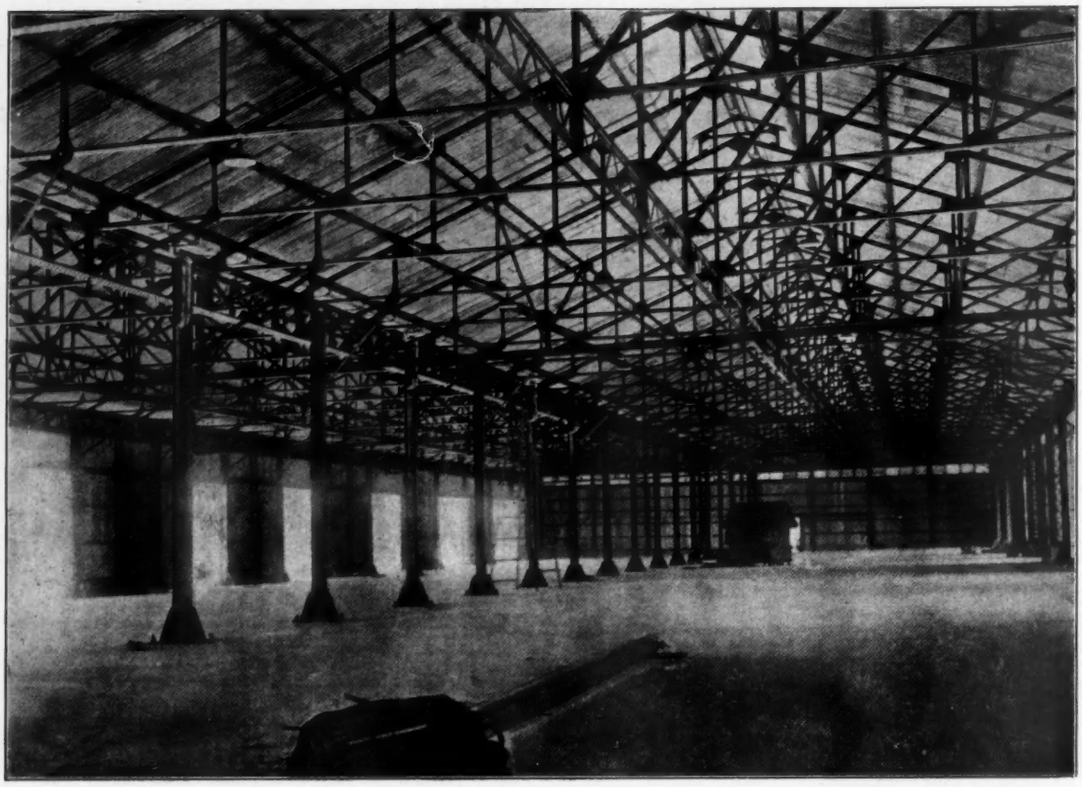


Fig. 5. Kilindini Harbour. Interior of new Single-storey Shed at Berth No. 3, Deep-water Quay, Floor Space 400 feet by 120 feet. Area 48,000 square feet. No. 4 Shed, Floor Space 420 feet by 120 feet. Area 50,400 square feet.

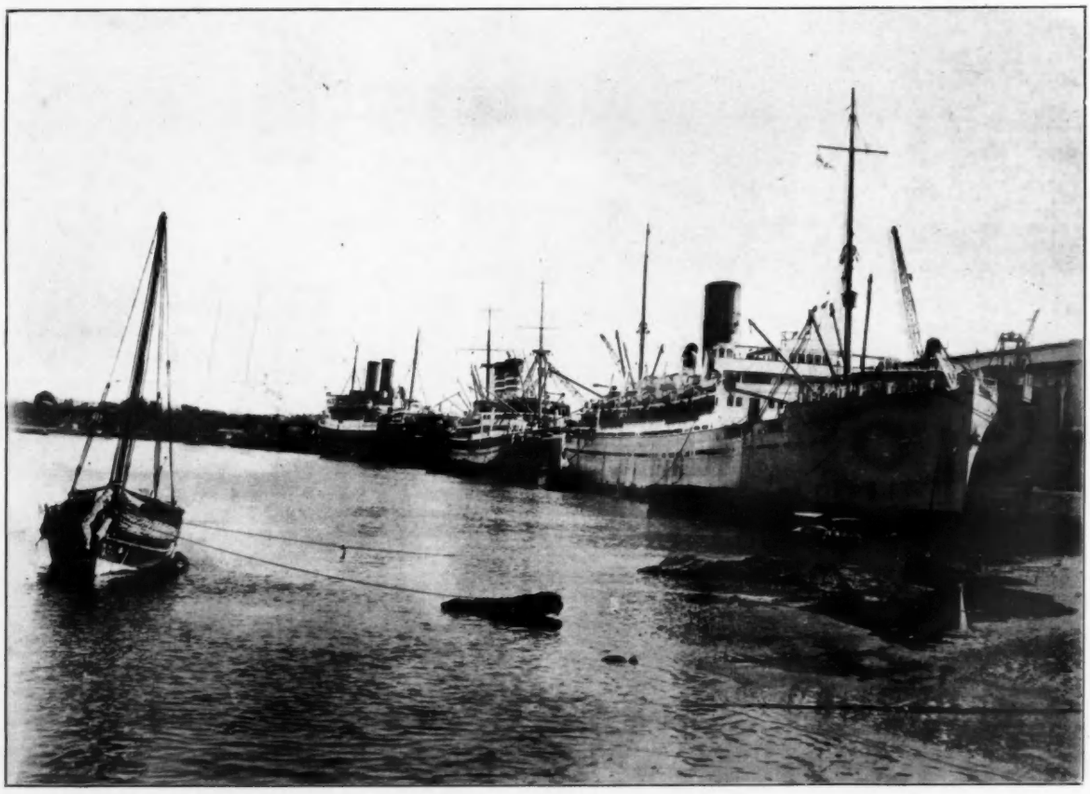


Fig. 7. Three large Passenger Steamships alongside the Quay at Kilindini Harbour.

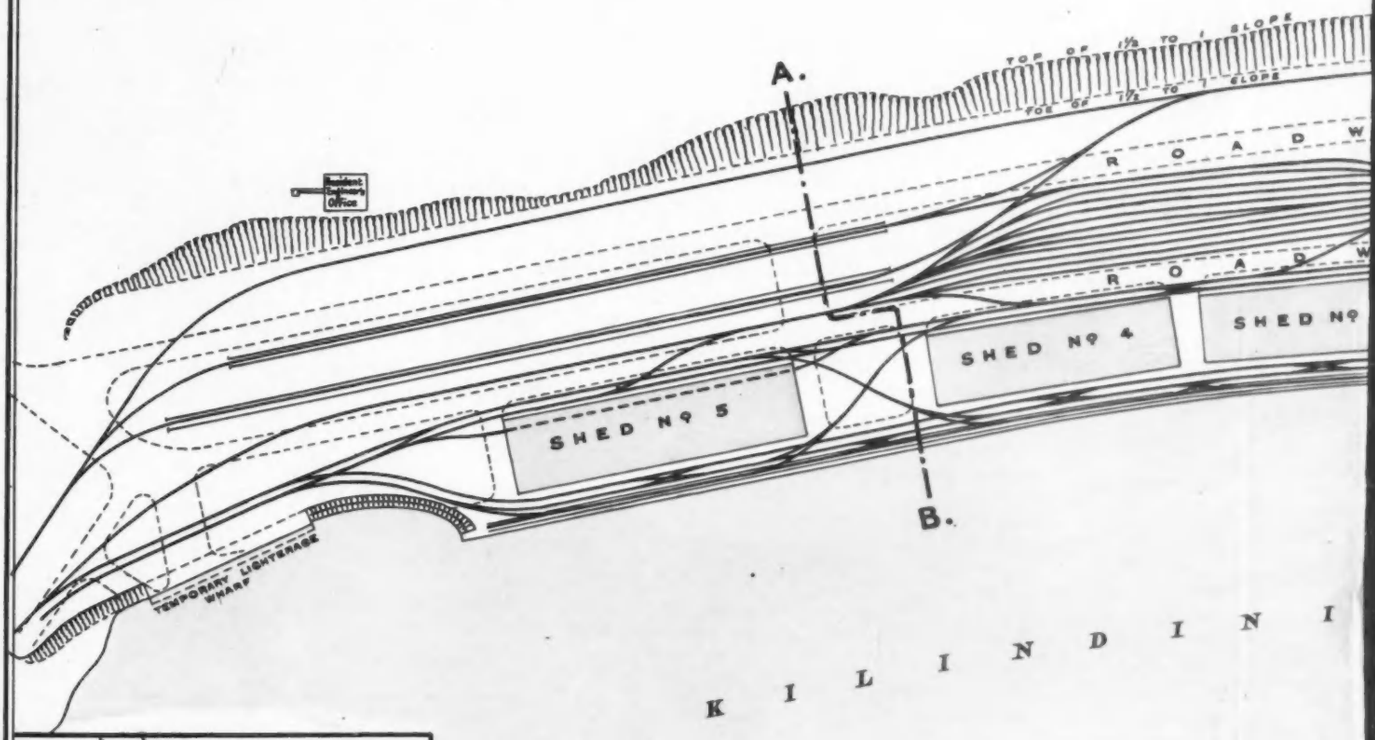
PORT OF MOMBASA, KEN

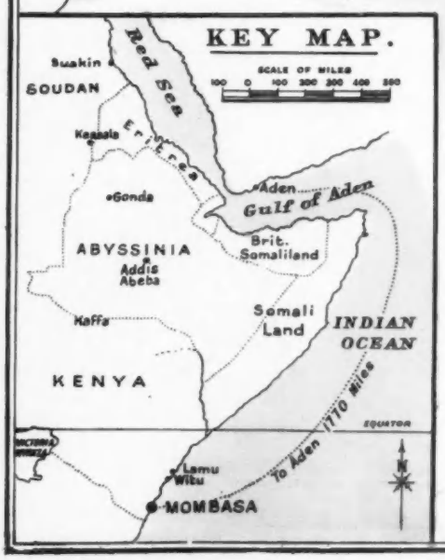
KILINDINI HARBOUR WORKS.

GENERAL LAY-OUT OF BERTHS Nos 1 TO 5.

CONSULTING ENGINEERS;- MESSRS COODE, WILSON, MITCHELL & VAUGHAN LEE, WESTMINST

RESIDENT ENGINEER;- Mr F. C. FFORDE, M. INST C.E..





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& Roadways to the north
have all to be constructe
has just commenced. Th
part of the earthwork is

Scale For Pla

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WARD & FOXLOW. Harcourt St. H

THE DOCK AND HARBOUR AUTHORITY,

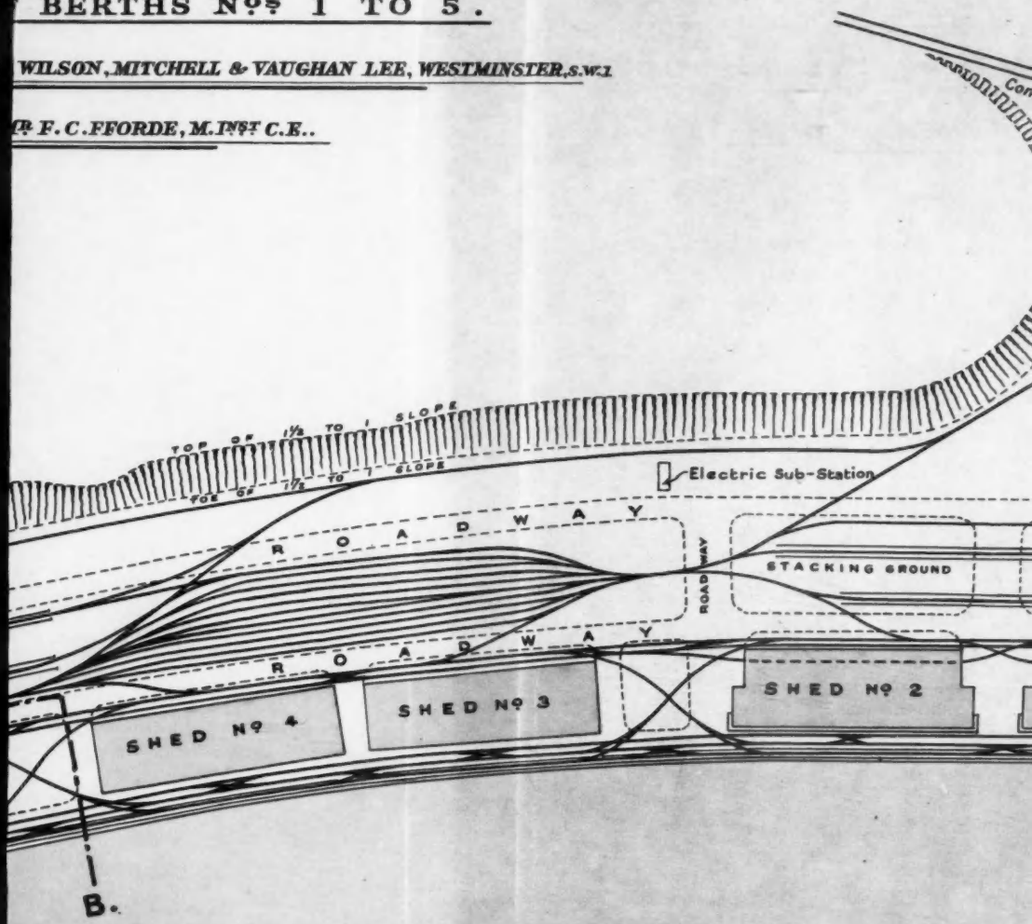
MBASA, KENYA.

ARBOUR WORKS.

BERTHS Nos 1 TO 5.

WILSON, MITCHELL & VAUGHAN LEE, WESTMINSTER, S.W.1

Mr F. C. FFORDE, M. INST C.E..

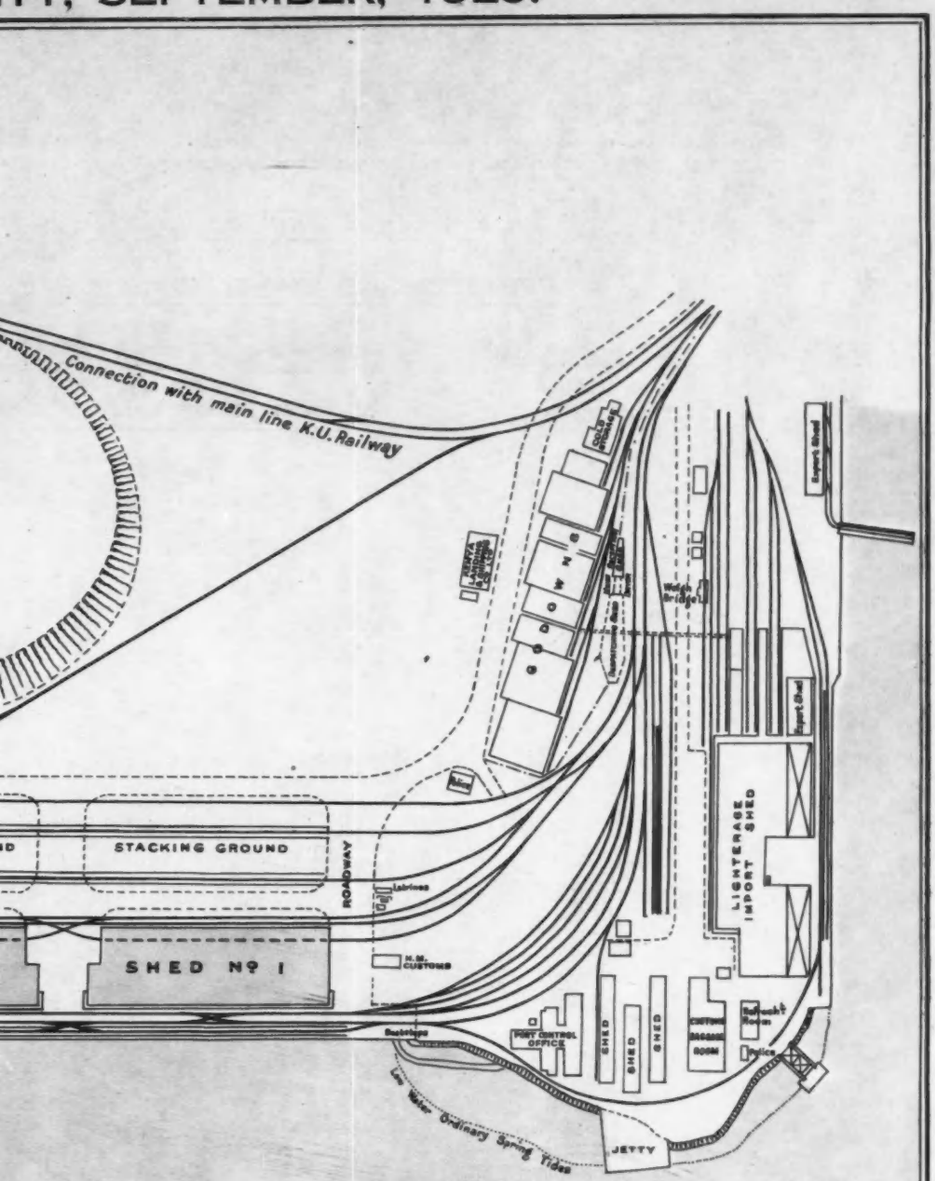


L I N D I N I H A R B O

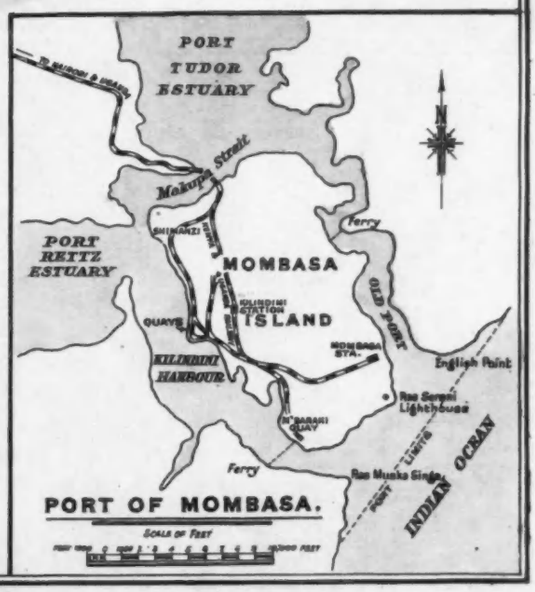
NOTE;- New Sheds are coloured Red. Quay Wall, Transit Shed, Rail Tracks & Roadways to the north of line A.B. have all to be constructed, and work has just commenced. The greater part of the earthwork is existing.

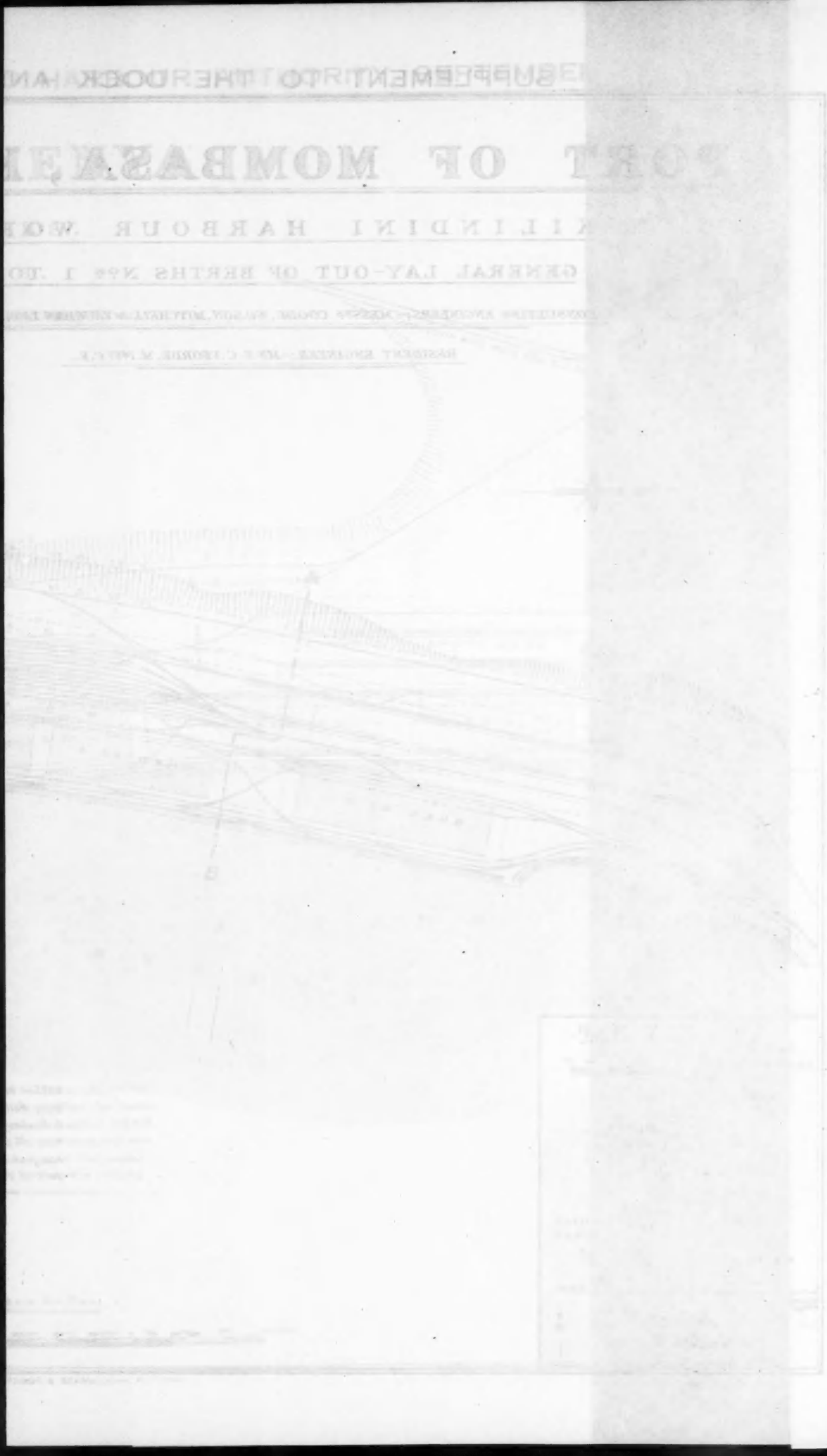
Scale for Plan.

WARD & FOXLOW, Harcourt St. Marylebone. W.1. 5385.


Connection with main line K.U. Railway
STACKING GROUND
ROADWAY
SHED Nº 1
LIGHTERAGE IMPORT SHED
Export Shed
PORT CONTROL OFFICE
SHED
SHED
SHED
JETTY
Low Water Ordinary Spring Tides

O U R


PORT TUDOR ESTUARY
Makupa Strait
Ferry
PORT REITZ ESTUARY
MOMBASA
ISLAND
QUAYS
KILINDINI HARBOUR
OLD PORT
English Point
Ras Serani Lighthouse
Ferry
Ras Mwaka Singo
INDIAN OCEAN
PORT MOMBASA.
SCALE OF FEET



Line) which constitutes the harbour's central link with the main line of the K.U.R., thus avoiding the already heavily worked tracks leading to sheds and berths Nos. 1 and 2. The harbour lines have two other links with the main line—the southernmost at M'Baraki Quay, and the northernmost at the Shimanzi corner of Mombasa Island. (See small map.) At M'Baraki all coal imports are landed per lighter, dumped and loaded into trains for haulage up country. The Shimanzi area is entirely allocated to the Oil Companies (together with the Magadi Lake Soda Company, which owns and operates its own loading jetty). It is proposed, as an integral part of future extension—as and when berths Nos. 6 and 7 may become necessary and their construction authorised— to lay down a small reception siding group immediately north of berth No. 7, into which trainloads from up country destined for the harbour could be run direct, the main-line engine cutting off and proceeding to shed, leaving its train to be dealt with by harbour locomotives. At the present time their is no through rail connection from the deep-water berth layout and the Shimanzi link to the main line; this connection will, however, be provided with the construction of No. 5 berth, which is now in progress.

Fig. 1 shows the Kilindini Harbour works of the Port of Mombasa from the landward side, and was taken early this year. The quay wall to the end of No. 4 Berth is clearly shown, while the false work for the construction of No. 5 Berth is just seen at the right hand edge of the photograph. No. 4 Shed had just started erection. The blockyard of the contractors, Messrs. Paulings, Ltd., lies along the foreground. Berths Nos. 1 and 2, with their double-storey ferro-concrete and brick sheds are seen in the distance with a British India steamship alongside No. 2. The transit sheds at Berths Nos. 3 and 4 are single-storey ones, as recommended by the Port Commission of 1925. These two sheds have been economically built of steel framework covered with 18-gauge galvanised plating. Should it become desirable, in years to come, to replace them with double-storey sheds, it would be possible to remove and re-erect them elsewhere. Among other uses, it is intended to utilise Sheds Nos. 3 and 4 during the cotton season to handle the steadily increasing cotton export of Uganda, which is expected to top 200,000 bales during 1929, with a corresponding heavy export tonnage of cotton seed. The maize export of Kenya is another very heavy crop, which is rapidly increasing. It is spread, as far as practicable, over all the transit sheds, as every ship coming alongside to load during the maize season takes some of that commodity. The close of the maize export season overlaps the commencement of the cotton export season, and this is the period of highest export pressure at Mombasa. Imports keep up all the year round, but are usually heaviest at the New Year, when the export of maize is also heavy.

The equipment of Berths Nos. 1 and 2 was detailed in the former article referred to above. One additional electric level-luffing quay crane of 5-tons capacity is being added to each of these berths.

The equipment of Berths Nos. 3 and 4 presents some points of interest. Along the quay face each berth has five cranes: two 3-ton, then a 5-ton, then two 3-ton; all electric level luffing. Messrs. Babcock and Wilcox secured the contract for these ten cranes and also for the additional 5-ton ones on Berths Nos. 1 and 2. Fig. No. 2 shows the erection of these quay cranes which have a jib radius of 55-ft. and a hoisting speed of 200-ft. per minute in the case of the 3-ton ones.

Fig. 8. Top Floor Arrangement Sheds, Nos. 1 and 2, Kilindini Harbour, showing method of carrying overhead travelling crane tracks.

While the cross-travelling electric cranes installed in the top floors of the transit sheds at Berths Nos. 1 and 2 are of the overhead type, having underhung swivelling jibs, the adoption of this type for single-storey sheds presents some difficulties. In a double-storey shed massive columns to carry the top floor are already there, and it is a simple matter to carry rows of these up to support both travelling cranes and roof. Also the top floor automatically limits the height of stacking by reason of the necessary weight per sq. ft. restriction; and this allows vertical space for the somewhat bulky overhead travelling cranes without raising the roof or interfering with the stacking of cargo.

Fig. 11. Four Vessels alongside Quay at Kilindini Harbour, June 1929.

The position is different in the case of a single-storey shed, where the use of overhead travelling cranes would require special cross rows of columns which would not otherwise be necessary. Also, there being no weight restriction on the floor, stacking can be higher in a single-storey shed than on the top floor of a double-storey one. To utilise overhead travelling cranes so as to allow of high stacking in a single-storey shed would necessitate raising the roof higher than would otherwise be required. This, and the rows of columns for carrying the cranes would add appreciably to the cost of the shed.

In the case of sheds Nos. 3 and 4 it was therefore desired to instal cross-travelling cranes whose weight would be carried by the ground alone; which could swivel and derrick so as to stack to a good height, and which would themselves occupy the smallest possible cross-sectional space. Messrs. Babcock and Wilcox put forward a special design, which was accepted.

Fig. 3 shows one of these mono-rail walking-jib electric cranes in the maker's workshop. It will be seen that the crane structure is very narrow, and that it travels across the shed on a single track let into floor level, tilting being taken care of by either-side rollers which pass along an inverted channel section attached to the shed roof principals. The crane itself is also balanced by means of the weight seen in the photograph. The jib is 25-ft. radius and can swing completely round the central column, while it can luff up to within a short space of the shed roofing, passing as required between the roof principals. Fig. 4 shows one of these cranes in action in Shed No. 3 stacking cotton bales. Fig. 5 shows the interior of shed No. 3 before the installation of these cranes, for which it will be noticed that the shed is free of columns except a single central row for the purpose of supporting the roof. An overhead channel guide for one of the mono-rail cranes can be seen in the foreground. These cranes can project their jibs through the shed doorways and load transfer trucks standing on the rail track at either the front or back of the shed. They can also handle—with cant hooks— five barrels of cement at a lift, and can rapidly carry and stack this commodity, which Kenya and Uganda import in large quantities.

The cross-section of Berths Nos. 3 and 4 is the same as that shown for Berths Nos. 1 and 2 in the former article in the *Dock and Harbour Authority*, except for the sheds being single-storey ones. The same cross-section will further apply to Berth No. 5, now under construction. In this case the greatest possible transit shed floor space is required, and No. 5 shed will be a double-storey one, 500-ft. in length by 120-ft. in width, built of ferro-concrete and brick. Its general design will be similar to that of Sheds Nos. 1 and 2.

It may appear that there is an unusual number of inter-track cross-overs, and scissors crossings in the general track layout. With the metre gauge it is, however, impossible to lay in slips; hence full-length inter-track connections are necessary at all track transfer locations.

Among the smaller works carried out at the port during 1928, an overhead covered bridge connecting the top floors of Sheds Nos. 1 and 2 is important. This enables export cargo to be hand-trucked from shed to shed, and has resulted in the elimination of a great deal of rail truck transfer which formerly had to be done, and which congested the quay tracks and also involved excessive overtime. An avoiding line has also been laid down between the harbour low-level lines and the privately owned godowns which are situated on the high level about three-quarters of a mile back from the quays. This enables these godowns to be shunted direct by harbour locomotives without any signal or " line clear " restrictions. On the marine side of the port working, the whole of the beacons, buoys and leading marks have been lit by automatic A.G.A. acetylene lights and equipped with sun-valve control. In the main lighthouse

The Port of Mombasa.

Fig. 9. Portion of Stacking Ground, Kilindini Harbour.

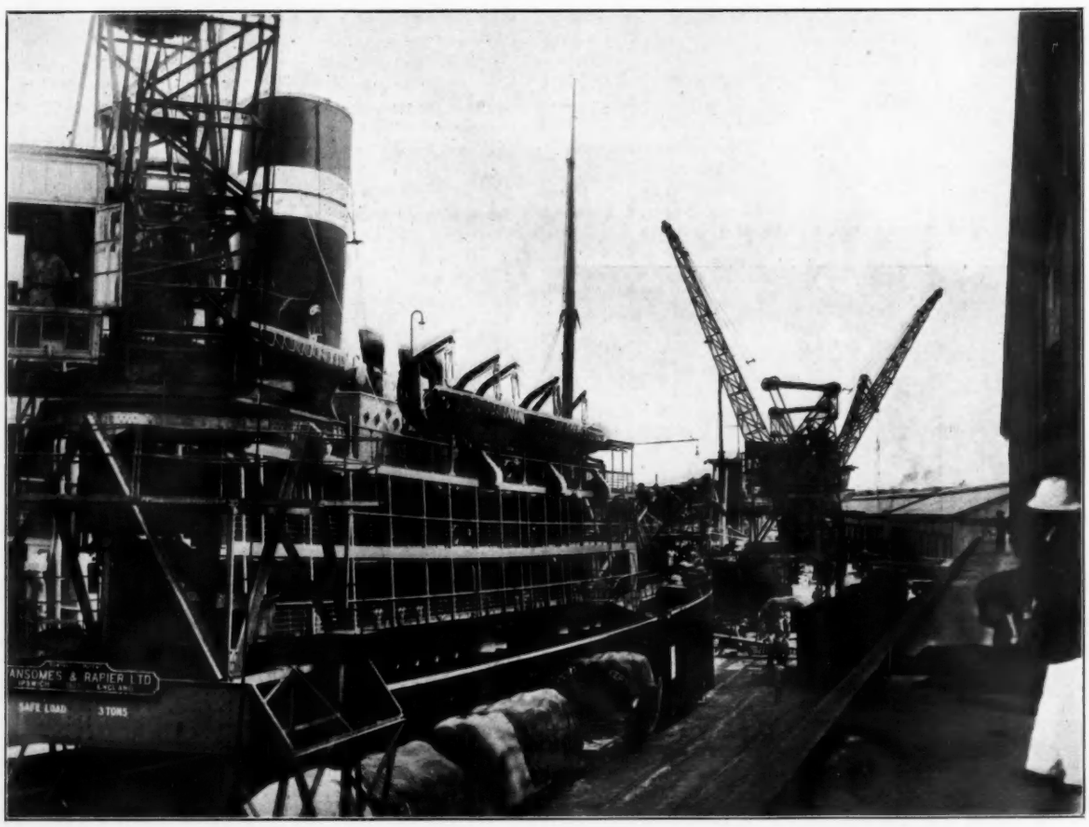


Fig. 10. No. 2 Berth and Nos. 3 and 4 Transit Sheds, Kilindini Harbour.

a new electric lighting apparatus has been installed giving a 4-second flash of 22,000 candle power through the lenses. This apparatus is the first of its kind to be installed and incorporates an automatic change-over device which brings a fresh lamp into circuit and focus in the event of the lamp in use fusing, or, should the electric current itself fail, an acetylene stand-by light is automatically brought into the focal plane and ignited, becoming extinguished again when the electric current is restored.

An additional twin-screw tug has also been built in England to the requirements of the port, and is now in service. Fig. 6 shows this fine vessel, which has been built by Messrs. Earles Shipbuilding Company, of Hull, and is named " Marie Felling," after the daughter of the late Sir Christian Felling, General Manager, until his death last year, of the Kenya and Uganda Railways and Harbours. A small marine slipway has also been installed to deal with repairs to the port launches and ferry craft. Negotiations have also been concluded for the construction and operation, by a local private firm, of a large slipway capable of taking vessels up to 2,000 tons deadweight, together with workshops for the carrying out of all classes of marine repair work.

Coming to the speed of loading and discharge at the port: this depends, as at all ports, largely upon the commodities handled, the nature of their stowage aboard, and, in loading, the continuity and promptness of the shipping orders received. What is probably a record for the port occurred during the Christmas-New Year season of 1928-29, when approximately 33,000 tons of imports were landed in eleven days; a quantity of export cargo being shipped simultaneously. An ordinary example of discharging a general cargo ship was that of the s.s. " Malda " this May, when 7,250 B.L. tons were landed in 112 ship working hours. The same vessel was loaded (largely with cotton seed) on her return visit in June at the rate of 4,200 B.L. tons in 65 ship working hours.

The total B.L. tonnage handled at Kilindini Harbour during 1928 (excluding bulk coal, also the bulk soda loaded by the Magadi Soda Company) showed the following percentage increase over each of the corresponding tonnages dealt with during the preceding six years:—

1927, 11.09; 1926, 29.62; 1925, 25.81; 1924, 55.88; 1923, 163.47; 1922, 271.39.

The tonnage of cargo handled across Berths Nos. 1 and 2 of the deep-water quay during 1928 totalled 380,570 B.L. tons, or an average of 373.11 tons per lineal foot of quay length. The balance of the port's general cargo tonnage was dealt with by lighters, both at Kilindini Harbour and the Old Port. Deep-water quay berth No. 3 was brought into use on January 1st this year, and No. 4 on June 1st.

The following table shows the total general trade and passenger position of the Port of Mombasa for the years 1927 and 1928. The B.L. tonnage figures include bulk coal and bulk soda and embrace both sections of the port, i.e., Kilindini Harbour and the old port:—

Year.	No. of Ships.	Net. Reg. Tonnage.	Imports. B.L. Tons.	Exports. B.L. Tons.	Passengers Landed.		Passengers Embarked.	
					Europeans.	Non-Europeans.	Europeans.	Non-Europeans.
1927	593	1,703,896	369,765	323,036	7,158	17,155	5,947	12,356
1928	637	1,814,731	447,301	344,870	7,864	15,678	5,951	11,793

Fig. 7 shows three large passenger vessels alongside Berths Nos. 1, 2, and 3; the Union Castle Company's s.s. " Llandaff Castle," the Deutsche Ost Afrika Company's s.s. " Urbena," and the Canadian Pacific Railway Company's s.s. " Duchess of Atholl " (on a tourist cruise). This illustration also shows one of the Arab dhows, of which 1,530 used the port of Mombasa during 1928. The design of these dhows has undergone no change through the centuries that they have plied on the Indian Ocean. Those from the Persian Gulf are the largest.

Fig. 8 shows the arrangement of the top floors in transit sheds Nos. 1 and 2. The method of carrying the tracks for the overhead travelling cranes on the roof columns will be noted.

Fig. 9 shows a portion of the stacking ground behind sheds Nos. 1 and 2. This ground is served throughout its length by a 10-ton and a 5-ton electric travelling jib cranes.

Fig. 10 is taken from the south end of the top floor verandah of No. 2 shed. It shows a British India vessel alongside No. 2 Berth and the sheds of Berths Nos. 3 and 4; a steamship is lying alongside No. 3.

Fig. 11 shows four steamships working alongside for the first time in June this year. The vessels are the British India Company's " Ellora," the Union Castle Company's " Llandaff Castle," the Clan Company's " Hypatia," and the Union Castle Company's " Guildford Castle."

The depth alongside the full length of all the deep-water quay berths is 33-ft. at L.W.O.S.T.

The new bulk-oil jetty at Shimanzi will enable tank vessels to lie alongside and discharge their oils direct through pipelines to the Oil Companies' tanks ashore. A short crane-equipped quay for handling cased oils to and from lighters and small coasting ships will form an integral part of the jetty. Pipelines are also being laid from the Oil Companies' tanks along the deep-water quay, and vessels lying alongside the latter will be able to take oil bunkers direct.

H.M. Ships " Arrow " and " Pandora " Launched.

For the second time this year a double launch took place at the Naval Construction Works of Vickers-Armstrongs, Ltd., at Barrow-in-Furness recently, when H.M.S. " Arrow " (a torpedo boat destroyer) and H.M.S. " Pandora " (a " P " Class submarine) were launched. The " Arrow " was christened by Mrs. Addison, the wife of Vice-Admiral A. P. Addison, C.B., C.M.G. (director of dockyards), and the " Pandora " by Mrs. Little, the wife of Rear-Admiral C. J. C. Little, C.B. (director of the Royal Naval Staff College). The two ladies were accompanied on the launching platforms by their husbands, Miss Addison, Miss Little, Commander C. W. Craven (managing director of Vickers-Armstrongs' works at Barrow and Newcastle), Mrs. Craven, British and foreign naval and military officers, and the principal officials of the Barrow works, with their wives and friends.

It is many years since a destroyer was built at Barrow, the last one being H.M.S. " Phoenix," which was launched on the 9th October, 1911. During the intervening years the Barrow works have been engaged principally on the construction of merchant ships, submarines and the larger type of warship, but the facilities of the firm are such that any type of warship can be built, engined and armoured in all respects ready for sea. In addition, the firm possess the Naval yard on the Tyne (where the " Nelson " was built), capable of constructing the largest war or mercantile ships afloat or that are likely to be required for many years to come.

Barrow is famous throughout the world for its submarines. The " Pandora " is the fourth of the " P " Class and the 156th submarine to be launched there. There are at present three " R " Class submarines on the stocks and six boats at the fitting-out dock, one of which, the Chilean submarine " Capitan Thompson," was handed over to Admiral Escobar, the Chief of the Chilean Naval Commission in London, on Friday, August 23rd.

While the firm has a record to be proud of, and has been relatively fairly busy during the last year or two, there are misgivings as to the immediate future. The number of employees has been gradually built up until about a month ago there were 13,500 in the works. Since then, however, as work has been completed, discharges have been necessary, and the numbers employed are decreasing each week. Every effort is being made to secure new work, but the fact remains that orders are not being obtained in sufficient volume to offset the work being completed, and this is bound to give rise to anxiety to the firm and its employees. It is common knowledge that about half the shipbuilding berths in the country are empty, and the diminution in the amount of Admiralty work available can only have the effect of making competition even keener for the limited amount of new tonnage that is in the market.

SPECIAL SHIP DESIGNED FOR TRANSPORT OF PAPER.

The Mersey Paper Company, Ltd., whose mill at Liverpool, N.S., is likely to come into operation about the end of this year, has ordered a specially designed steamer for the carriage of paper to ports along the Atlantic seaboard of Canada and the United States.

The vessel is to be constructed by Earle's Shipbuilding and Engineering Company, Ltd., of Hull, England, the architect being Mr. Walter Lambert, of Montreal. The vessel will be specially constructed with the deck brackets above the main deck, so that the hold space will be entirely free from obstructions. It will have a capacity of 4,300 tons of paper, which will be loaded by double post derricks through extra large hatches into five watertight compartments. The cost will be $450,000.

North-East Coast Notes.

The expansion of the coal trade on the North-East Coast is continuing, but has in part been checked by want of tonnage and to some extent, it is complained, by want of railway waggons. Still, apart from the August Bank Holiday interruption, trade is progressing satisfactorily both on Tyne and at Blyth, although there are complaints at Sunderland that the Tyne is filching some of the trade that formerly was done on the Wear. The shortage of tonnage is attributed largely to the fact that between thirty and forty vessels of British, Swedish, Norwegian, and German nationality have been chartered by the Anglo-Soviet Shipping Co., at the instance of the Russian Government, for trading between the White Sea, the Baltic, and various Continental ports. A large proportion of this tonnage would otherwise have been used for the conveyance of fuel, and the market has felt the deprivation. At the same time, the diversion has not been without its good feature, for a very large proportion of the vessels have been bunkered at local ports, and a large number have been calling weekly at Blyth before proceeding to Archangel, and the amount of fuel thus shipped has been so considerable as materially to swell the shipments from that port. This trade is likely to continue so long as the Baltic remains open—that is, into the month of October.

BLYTH'S GOOD RECORD.

The position is so satisfactory at Blyth that at the July meeting of the Harbour Commission the shipment figures for the previous six months showed an increase of 15 per cent. over the figures of 1913, the figures being:—2,695,136 tons in 1929, and 2,337,443 tons in 1913. Mr. Ridley Warham (chairman), congratulated the Commission upon the steady continuance of the improvement in the export trade, which had resulted in a new record for the port being set up for the six months ended June 30th. The possibility of a further reduction in harbour dues was receiving very serious attention, and where possible would be given effect to. The charge for dues in the case of ships calling for bunkers, refuge, and repairs had already been reduced to the pre-war level.

After the business was concluded the Commissioners entertained to lunch a number of gentlemen directly interested in the trade of the district, the party afterwards proceeding on the Commissioners' tug " Croft " to inspect the river and the West Staiths, at which a ship 479-ft. by 62-ft. beam was taking cargo and bunkers of 12,000 tons. Another factor assisting the expansion of Blyth trade which may be noted here has been the shipment of large cargoes of coal for Australia.

SOME SMART PERFORMANCES.

Reference has already been made to the effect of the tonnage shortage, but, troublesome as it has been, it has developed a species of hustle at the docks which is very beneficial to trade. For example, the steamer " Islington " gave a very fine coasting performance. She left Blyth at 9 p.m. on July 18th for London, and, having discharged 2,300 tons at Tilbury, the vessel arrived in the Tyne at 6 p.m., July 21st, the voyage having been completed in two days 21 hours. An instance of very smart dispatch was also reported from Tyne Dock. The steamer " Lerche " arrived at 2.30 p.m. on July 25th and sailed at eight o'clock the same evening, taking 1,700 tons of coal and bunkers in 5½ hours.

Another instance of a sharp " turn round " was reported at the beginning of August. The steamer " Blackhill," with a cargo of iron ore, arrived in Tyne Dock on the evening tide of July 31st and, after discharging her cargo of about 3,850 tons of ore, went under the coal spouts and loaded about 3,650 tons of cargo coal and 250 tons of bunker. She completed loading at 9.30 p.m. on August 3rd, when she left the Tyne.

MORE TYNE CONCESSIONS.

The River Tyne Commissioners at their meeting on July 16th made further concessions to due payers, which brings the total amount of recent concessions to £32,000. All vessels, whether above or below bridges, will have the existing 50 per cent. above pre-war dues reduced to 40 per cent. This is in addition to the reductions made at their previous meeting. Another concession, which will cost £2,390, is the lowering of all tolls on the vehicular traffic using the ferry boats at Shields.

The Commissioners at the same meeting decided to accept the tender of Messrs. Philips and Sons, Dartmouth, for a new twin-screw ferry boat. Mr. H. P. Everett, who presided, explained that the Dartmouth tender was much lower than local tenders. They were specialists in the building of such vessels, the Commissioners being well satisfied with one already built by the same firm. He also intimated that in the terms of the contract the material used in the construction of the vessel had to be purchased on the North-East Coast.

A return of the business done at the Commissioners' docks and shipping places indicates that the merchandise shipped during the past six months shows an increase of 64.75 per cent. when compared with the same period last year.

An agreement has been reached between the North of England Steamship Owners' Association and the Tyne Tug Owners' Association for a reduction of 5 per cent. in towage rates above Newcastle bridges. The reduction came into operation on August 1st. An additional discount of 2½ per cent. on vessels of 2,000 tons and upwards will also be made on and from January 1st, 1930.

RIVER WEAR TRADE.

Contrary to the experience of the Tyne and Blyth ports, coal shipments on the Wear have shown a general contraction for some months past, and, with a hope of stimulating trade, the River Wear Commission decided that as from August 1st the present charges of 8½d. per ton on coal and 1s. 0½d. per ton on coke would be reduced in each case by 3d. Towards meeting the cost of these reductions the Commissioners will apply the proceeds of de-rating. According to the Chairman, Mr. J. E. Dawson, de-rating has caused the port to lose trade, as the de-rating favoured public railways and not colliery railways. Sunderland coal shipments are mostly carried over colliery railways, and the port is therefore severely handicapped. It is contended that Tyne Dock, which gets its coal across London and North-Eastern Railway lines, has consequently been able to attract trade from the Wear.

Imperial Chemical Industries, Ltd., who have been contemplating the acquisition of a site of 300 acres for the extension of their works and the construction of a new dock on the Tees, have decided to defer the project. It is understood, however, that the firm have secured a five-years option on the site from the Tees Conservancy Commission. Meanwhile, the Tees Commission are stated to be considering several development schemes, among them being the provision of more deep water wharves.

PERSONALIA.

Two well-known figures in the North-Eastern area have just been removed by death. One was Mr. James Westoll, the well-known Wear shipowner, and the other Mr. Charles E. Mills, chairman of Messrs. Gjers, Mills & Co., Ltd., Ayresome Ironworks, Middlesbrough, who was closely identified with the Tees iron trade. Mr. James Westoll was the eldest son of the late Mr. James Westoll, of Sunderland, one of the founders of the steam shipping line of Messrs. James Westoll. Until recently Mr. Westoll was senior partner in the firm of Messrs. James Westoll, Sunderland, and he was chairman of Messrs. James Westoll (London), Ltd., the Middle Dock and Engineering Co., Ltd., South Shields, and Messrs. Leversons Wallsend Collieries, Ltd. He was also a director of Messrs. William Pickersgill & Co., shipbuilders, Sunderland, Messrs. S. P. Austin & Co., shipbuilders, Sunderland, and Messrs. R. Miller and Son, London.

Port Dues in Yugoslavia.

The Department of Overseas Trade has received from the Commercial Secretary at Belgrade the following list of official rates of exchange for the payment of port dues in Yugoslavia during the month of August, 1929, which have appeared in the " Official Gazette ":—

	Dinars.
1 Gold Napoleon	218.00
1 Pound Sterling	276.30
1 American Dollar	56.85
1 Canadian dollar	56.55
1 German mark (gold)	13.58
1 Belga	7.92
100 French francs	223.00
100 Italian lire	298.00
100 Dutch florins	2,286.00
100 Roumanian leis	34.00
100 Danish crowns	1,514.00
100 Swedish crowns	1,524.00
100 Norwegian crowns	1,515.00
100 Pesetas, Spanish	830.00
100 Greek drachmas	73.80

Personal enquiries regarding shipping and transport matters should be made at the City Office of the Department (Shipping and Transport Section), 73, Basinghall Street, London, E.C.2.

BREMEN SEA TRAFFIC IN JUNE AND FIRST HALF OF 1929.

In the first half of 1929 shipping traffic amounted to 4,373,694 net registered tons as compared with 4,237,274 net registered tons for the same period in the previous year.

In the first half of 1929 the quantity of goods exported and imported was 3,247,100 tons as compared with 2,861,100 tons for the same period during 1928. The chief increase in import was that of English coal. Imports of grain were considerably decreased.

The total traffic in the Weser Ports during June was as follows:—Incoming: 623 vessels, 719,821 net register tons; outgoing: 647 vessels, 723,875 net register tons.

The Baltic and International Maritime Conference.

Annual Report for 1928-1929.

(*Concluded from page 294*).

Another troublesome question which has developed in particular in Swedish and Norwegian ports is the cost of overtime when discharging coal under the Baltcon Charter, overtime to customs watchmen as well as to consignees or their stevedores for the discharge.

From a practical owner's point of view the basis of the stipulation that the cargo shall be discharged at a certain quantity per day of 24 hours ought to be that the quantity in question should be fixed at such a height that it would take 24 hours to discharge it. The practice was adopted by certain merchants of inserting in the charterparty a quantity which could normally be discharged during an ordinary working day, but if there was congestion, or if more convenient for other reasons, they then kept the vessel idle during the day and discharged the cargo altogether on overtime, maintaining that they were entitled to do so on the basis of the stipulations of the charterparty. As the charterparty in such case also usually stipulated that the cargo should be discharged at " current rate " or " current cost," the vessel was debited with the extra cost of overtime on the contention that the vessel should pay any cost arising for the discharge during 24 hours according to the tariffs existing in the port, that is to say, the cost of overtime in addition to the rate usually fixed per ton for discharge during normal working hours.

In a number of cases consignees agreed to meet owners, accepting a reasonable explanation of the considerations on the basis of which the shipowner had entered into his contract, but it was necessary to advise members that the only effective manner of avoiding the somewhat incalculable extra charges of overtime was to stipulate a fixed price in the charterparty or free discharge.

Similar considerations prevailed in regard to the extra customs charges for watching the discharge outside ordinary working hours, and settlements were made in some of the cases on the basis that the charges were paid by merchants if the discharge on overtime took place in their interest—that is to say, in order to enable them to avoid paying demurrage—and by the vessel if the discharge on overtime was performed in accordance with a reasonable interpretation of the charterparty.

PORT CONDITIONS.

The strikes mentioned in the foregoing—namely, in Finland and Antwerp—also caused congestion. As far as British ports were concerned, there were reports of congestion from a few ports, but it must be considered a proof of the energetic measures taken in certain ports to deal with wood cargoes that the congestion was no more serious than proved to be the case. The arrivals were particularly heavy during the latter part of the season owing to the fact that many charterers held back in the hope of a settlement of the Finnish strike and then had to charter in a hurry before the close of the season.

Antwerp, however, suffered very severely. It proved necessary to make repeated protests to the responsible parties, the port authority as well as merchants' organisations, and to collect particulars of actual experiences in order to enable owners to estimate the delays which would arise.

Part of the congestion was due to the impractical arrangement as far as vessels are concerned—namely, that wood cargoes have to be discharged at two different places, the deck cargo at one place and the cargo from the hold at another where sheds are available for the storing of the cargo. The consequence was that vessels were delayed twice, first on turn for discharge of the deck cargo, and secondly for discharge of the cargo from the hold.

While it is comprehensible that merchants are desirous of protecting the wood after discharge in the best possible manner, it is not in the true interest of the port to neglect the views of shipping in the manner which was done during the 1928 season. No opportunity was or will be lost to bring this home to the parties concerned.

Assurances were received of considerable extensions of the quay space available for wood cargoes, but these extensions would not be completed for another couple of years. The necessity was therefore emphasised of taking steps to relieve the position in the meantime so as to prevent a recurrence of last year's congestion.

Congestion also arose at Hamburg for the discharge of fruit cargoes owing to the severe winter. Merchants were disinclined to remove the fruit from the storage buildings on account of the risk of frost, and for the same reason discharge was only allowed to proceed during the middle of the day. Although large and up-to-date buildings are available for the storage of fruit at Hamburg, the accommodation was evidently insufficient, as similar difficulties did not arise to the same extent at other centres for fruit discharge. Whatever may be the cause, there is no justification for merchants to use vessels as warehouses without paying shipowners a suitable compensation.

Representations were made to the authorities, and it is understood that the available accommodation will be increased as soon as possible.

The difficulties experienced in Finnish ports during the 1928 season were aggravated owing to the fact that the available facilities are obsolete and insufficient in many ports. The attention of the authorities was called to the necessity of introducing improvements, for which purpose the co-operation of merchants was solicited.

Although Trangsund is the largest centre in the world for the export of wood, no separate customs office has hitherto existed there, and the clearance of vessels inwards and outwards has had to be performed at Wyburg, which meant a considerable delay and extra cost. Representations were made to the authorities, and a separate customs office has been established from the commencement of the 1929 season.

The system adopted in a number of British ports of levying harbour dues according to the geographical situation of the ports from which the vessel arrives or to which she is destined has caused complaints in cases where the effect of the regulations was rather harsh in practice. For instance, at Middlesbrough one line of demarcation is drawn at the North Cape, which means that vessels bringing ore from places east of the North Cape have to pay higher dues than vessels carrying the same kind of cargoes from places west of the North Cape. In spite of representations made to the responsible parties, the anomaly was not corrected on the contention that it might lead to similar claims being made by shippers of ore from other places—namely, from the eastern part of the Mediterranean —which were included in the same category as ore cargoes from east of the North Cape.

A more accommodating attitude was shown by the Dantzig port authorities in regard to their regulations, in particular for the use of the crane berths. A dispute had arisen owing to the fact that a merchant who was the receiver of two cargoes of scrap iron shipped by two vessels, of which the second arrived before the first had completed discharging. To avoid paying demurrage for the second vessel, the merchant refused to discharge during the third shift at the cranes on the first vessel, which he was entitled to refuse according to the charterparty, but not according to the harbour regulations. The consequence was that the harbour authorities ordered the first vessel to shift so that the second vessel could enter the same berth. The cost of shifting incurred by the first vessel was comparatively large. A refund was claimed and was obtained in part.

On this basis the authorities gave the promise that they would in future endeavour to cope with similar attempts on the part of merchants to make use of the harbour regulations to suit their own convenience. If a merchant refused to load or discharge a particular vessel through the shifts required according to the regulations, on the contention that no cargo was ready or that he could not take delivery, the berth of such vessel would not be given to another vessel waiting to load or discharge similar cargoes to or from the same merchant. This procedure will be an important protection for vessels loading coal, as cases have occurred where cargoes of coal destined for one vessel were given out of turn to another vessel without owners having any effective means of protest.

On the whole port conditions have remained stationary. No reductions or increases of any importance have taken place. Some correspondence arose in regard to the reduction granted for overseas cargoes discharged in Danish provincial ports during the previous year, as the reductions appeared to have been fixed so as to act as a discrimination against certain countries. The question was one which referred to the commercial relations between such countries and Denmark, and no general action could therefore be taken, but the national associations which made the enquiries were given a detailed explanation of the position on the basis of investigations made by the committee which had originally dealt with the question of the reduction.

The stevedoring monopoly in Spanish ports, the introduction of which was threatened at the beginning of 1928, and against

which urgent representations were made by the Conference, was modified in a manner which can only be welcomed if the decree which was finally issued on the subject is carried into practice in full. The decree provides, inter alia, for an enquiry into the conditions prevailing and the facilities available in Spanish ports, and enables local harbour authorities to acquire the necessary appliances or plant to ensure a prompt turn-round for vessels in accordance with modern requirements.

AGENCY BUSINESS.

The agency tariffs at Dantzig, Gdynia, and Memel have been subject to considerable criticism owing to the fact that it was maintained that the high level of these tariffs was due to the return commissions which were paid to merchants. It was admitted at Dantzig that it had been impossible to avoid this obnoxious system owing to the competition on the part of merchants' brokers. A revision of the official tariff was advocated on the basis of net clearance fees, as such fees would be considered as current charges, in force also for vessels consigned to merchants' brokers.

At Gdynia and Memel it was denied that return commissions were paid, and the high level of the fees was justified by a reference to the higher cost incurred by shipbrokers at the ports in question. Further investigations will be made into the alleged higher cost as compared with other ports as far as Gdynia is concerned, while at Memel and Dantzig there is no immediate prospect that further progress can be made.

No satisfactory solution was reached in regard to the double agency fees charged in French ports whenever merchants' brokers have to be employed according to a stipulation in the charterparty. Such broker or agent is very rarely a sworn broker, and cannot therefore undertake the actual clearance through the customs, for which business he has to employ a sworn broker whose charges are fixed officially. The procedure adopted by the agent is then to debit the vessel with the official fee of the sworn broker in addition to his own agency fee. For the latter fees there are no tariffs, and they vary not only between the different ports but also as between various firms in the same port. The fact is that owners have no means of knowing beforehand either that such agency fees will be charged or to how much they will amount.

In individual cases refunds or reductions have been obtained. Thus a firm of agents at Rouen, which had instituted the procedure of debiting vessels with no less than 2 per cent. for agency commission, were induced to desist from their procedure. This result was obtained by co-operation with receivers of the cargoes in question, as they agreed in future to appoint only agents who were sworn brokers.

In spite of what has been maintained to the contrary, no single instance was met with among the many cases which were investigated where it was necessary for the owners of tramp vessels who had free hands to employ their own broker to appoint an agent as well as a sworn broker. The conclusion to be drawn herefrom is that in normal circumstances a sworn broker is able to perform the duties which are required in order to attend to the clearance through the customs as well as to the vessel's ordinary business.

The obnoxious nature of the system of merchants' brokers was strikingly emphasised in certain cases where such brokers failed to remit the freight which had been collected by them on behalf of the shipowner. Investigations proved that, although merchants had insisted on the appointment of the brokers in question, they had no knowledge of the financial standing of the firm, and did not apparently consider themselves under any obligation, moral or otherwise, to ascertain whether the firm deserved their trust. It should be mentioned that in one particular case which occurred at Memel the weak financial standing of the broker had evidently been common knowledge, while merchants alone appeared to be unaware of that fact.

The system of consigning vessels to merchants' brokers was considered to be at the back of the difficulties experienced in regard to the discharge of fruit cargoes in the United Kingdom, where owners in many ports have to pay for a tally taken sometimes after the departure of the vessel. Owners are thus held liable for shortages that may have arisen after the cargo has left the vessel. In a port like Hamburg there is no difficulty about taking a tally of fruit cargoes as and when the cargo leaves the vessel, but receivers in United Kingdom ports seem to be interested in making such procedure out to be impossible, and so long as owners leave the agency business in their hands or in the hands of their agents no improvement is likely to be obtained.

Several complaints were received concerning the agency fees in U.S.A. ports, especially in the smaller ports, where there is little or no competition. Reductions were promised in certain ports, but it was considered necessary to issue a general recommendation to members to insist on such reduction in each case, as the impression was that there might be a prospect of obtaining a satisfactory result if pressure was brought to bear on the parties concerned.

MISCELLANEOUS.

A report was received to the effect that it was contemplated to increase the tonnage dues levied in Finnish ports at the rate of 40 penni per N.R.T. to 2.00 Fmk. per N.R.T. As the revenue from these dues is destined exclusively for the purpose of paying pensions to Finnish seamen, it was considered unfair to burden foreign shipping with such charges. It was estimated that Finnish vessels would have to pay 23 per cent. of the dues only, while vessels of other nationalities would have to pay the remaining 77 per cent. Representations were made through the proper channels on the basis that dues on vessels should not be used for a purpose which is clearly taxational in character, as this system will serve to counteract the attempts which are made to avoid double taxation of the earnings of shipping. The proposed increase in the dues has so far been held up, but the question will be taken up for further discussion when the Finnish Parliament meets again in the autumn of this year.

A tax of 3 per cent. on gross freights was introduced during 1928 by the Cuban Government in violation of the principle that shipowners should not be called upon to contribute towards the revenue of any country in which they are not domiciled. A similar tax had previously been introduced to the amount of 2 per cent. in Mexican ports. In spite of the representations made by various national associations whose members were particularly interested in the trades to and from the ports in question, no headway was made with the Governments concerned.

Recommendations were therefore issued to members as required from time to time to stipulate when negotiating for fixtures that the taxes should be paid by charterers. In spite of provisions in the respective laws with the intention of making vessels or their agents directly liable for the taxes, practical experience proved that the Governments could not prevent that the burden of the taxes were transferred to charterers.

A number of questions which can be classified under the one heading of " Customs of the Port " were dealt with. Thus attempts were made to establish that it should be customary in Finnish ports for vessels to shift to two or more loading or discharging places within the same port or district, irrespective of whether any stipulation to that effect was inserted in the charterparty. The basis of these claims was carefully analysed, and it was shown, not only that there was no justification in the conditions of the ports for expecting the vessel to shift free of charge, but that it was against the provisions of the Finnish maritime law.

Similar complaints were made in regard to the shifting of vessels when loading wood at Dantzig, but after a careful examination of the conditions members were advised that the alleged custom did not exist and that, in fact, the vessel was not obliged to shift unless an express agreement was made to that effect when the vessel was fixed. It was usual for regularly trading vessels to agree to such shifting, but this could not be said to constitute a custom of the port.

When the charterparty stipulates that a certain quantity shall be discharged daily, Sundays, holidays, and other periods such as after noon on Saturdays to be excepted, or that time shall count from a certain point with the same exceptions, the question arises whether these excepted periods shall be included in the loading or discharging time if they are used. Members' attention was called to the position in the various ports as and when complaints were received, and it was recommended that captains should refuse their permission to commence or to proceed with the loading or discharge unless merchants agreed to count the time.

Although the interpretation of charterparties ought to be a question for the court to decide, the Libau Exchange Committee had given a decision to the effect that the cost of discharging coal cargoes carried under the Welsh Coal Charter should be calculated on the bill of lading quantity also when the freight was settled on that quantity less 2 per cent. in lieu of weighing, according to the option granted to receivers in the charterparty. The attention of the committee was called to the decision given by a British court concerning this question, as a result of which the dispute was settled on the same basis—namely, by deducting 2 per cent. also from the cost of discharge.

As a result of the representations which were made in connection with the resolution passed at our Annual General Meeting at Hamburg, 1928, the Spanish Government issued a decree in July, 1928, according to which it should no longer be necessary to state the weight of wood cargoes in the manifest. The number of pieces as well as the cubic of the wood in cubic metres should be entered instead, which was satisfactory from a practical point of view, as wood cargoes are not usually weighed, while number of pieces and cubic in standards are known. The Spanish Government went a step further shortly afterwards by fixing the average weight of wood cargoes for the purpose of payment of the transport tax for all countries in Europe with which Spain had concluded commercial treaties.

It is understood that the customs fines which had been imposed on members of the Conference in this connection have been remitted in full, and no new fines have been levied.

As the system of paying gratuities to customs officers in Spanish ports, which was legalised some years ago, seemed to be abused, a number of cases were investigated in which unrecognised charges had been made. The object of the gratuities in question was to fix officially the extra charges which should be paid by shipowners for various services rendered by the customs officers, so as to do away with the more or less arbitrary amounts with which shipowners had been mulcted up till then.

In some of the case the overcharged amounts were refunded, but, owing to the fact that shipowners might run the risk of their vessels being exposed to difficulties if the gratuities were refused, it was considered preferable to make general representations for a future improvement rather than to claim refunds in special cases.

In addition to these questions of a more specific nature, information was also collected concerning the conditions prevailing in certain trades in regard to the basis cost to be reckoned with. This was the case, for instance, in the ground nut trade from West Africa to European ports. The particulars were published in the Information Bureau Circular or by special circulars if and when it was considered desirable to call members' attention to the necessity of holding out for higher freights.

Similar measures were taken in regard to cargoes of patent fuel, in order to show that the additional freight rate generally allowed for such cargoes was not sufficient to cover the extra cost that would arise if charterers availed themselves of their option to ship part or full cargoes of patent fuel.

Reporting of fixtures was also dealt with, but, as it proved difficult to obtain co-operation with practical results, the activities were confined to counteracting the attempts made by charterers to obtain low opening figures in seasonal trades, such as the wood trade and the ground nut trade. In several instances information was obtained which effectively proved that the fixtures reported by charterers could not be described as representative of the actual condition of the market. They had, in fact, been concluded in special circumstances, but were given out as normal fixtures. With the assistance of members other fixtures were circulated which were more indicative of the general trend of the market, and the position was reviewed from time to time for the benefit of members who were not able from their own experience to check the reports of charterers and who might therefore be influenced by such reports in their negotiations.

Of other questions of a general nature may finally be mentioned the correspondence which was exchanged with various parties concerning the delivery of cargoes without bills of lading. Unfortunate experiences prove the risk of delivering cargoes without a satisfactory bankers' guarantee. The form of guarantees adopted in certain countries was considered insufficient, and members were recommended to insist on the guarantee form compiled by the solicitors of the Northern Shipowners' Association, which was intended to cover all the contingencies that might arise in such connection.

GENERAL OBSERVATIONS.

In concluding this report it may be appropriate to mention a few examples of a category of cases which have not been included. These cases practically all arose through the checking of disbursements accounts, which forms an important part of the work of the Information Bureau.

A vessel loading phosphate at Bougie was debited with 2735.50 fr. under the heading of " droits de statistique," which proved on investigation to be in the nature of accessory customs charges rightly payable by the cargo. On charterers' attention being called hereto, the amount was refunded.

The account for the discharge of a vessel at Zwyndrecht was made out by the broker who had attended to the clearance of the vessel, and the rate debited was 1s. 3d. per ton plus 10 per cent. labour insurance plus 63.00 fl. for half cranage. Investigations brought to light that receivers, who had discharged the cargo themselves, had debited the vessel with the cost in Netherlands currency, the total of which amounted to about 1s. 3d. per ton including labour insurance and half cranage. The difference, which had been collected by the broker, amounted to about £20, which was refunded, together with three smaller items to the amount of about £2.

When checking a disbursements account from Castellon, observations were made concerning a seemingly official charge to the amount of 2394.— pts., debited under the heading of " Muellaje." It was an attempt on the part of receivers to make the vessel responsible for a charge which was rightly payable by themselves. The amount was duly refunded.

These three cases are typical of a number of similar occurrences where the checking of disbursements accounts has brought overcharges to light. The importance of the cases is not the amounts themselves, but that the action taken by the Information Bureau and the publicity given to such matters effectively prevent similar overcharges in future. Not only the individual owner, but all other owners coming to the same ports therefore reap the benefit.

While Protection and Indemnity Clubs, for instance, are mainly interested in the merits of each case, the Information Bureau is only incidentally so interested, and the leading principle is that practical arrangements should be made for the future.

Although in theory it might sometimes seem difficult to distinguish between the functions of a club and those of the Information Bureau, this is very far from being the case in practice. There is a clear line of demarcation. No single dispute has arisen in this respect, and, apart from legal proceedings, valuable assistance has been rendered by clubs, while, on the other hand, they have been supplied with information concerning practical points of importance to their legal proceedings—a natural consequence of the interplay of questions of law and of fact in a large number of shipping cases.

The Information Bureau has the advantage of being unhampered by national considerations. Comparisons can be made irrespective of geographical boundaries and points of similarity brought to light. On these general lines the activities become international in the true sense of the word, and international also in their effect, as economic retribution is waiting upon the action of authorities and others with the same certainty as a judgment in a court of law if liberties are taken with international principles for national ends. Shipping is the most purely international industry, and any attempt to deviate or to interfere artificially in its smooth flow will, like a boomerang, return to the source of its origin. The Information Bureau is a small wheel in this international machinery, and its main function is to provide as a regulating factor the means of a swift and sure retribution against recalcitrant countries and parties by furnishing shipowners with the necssary information to enable them to take adverse conditions into account in their freight rates and to discriminate against such countries and parties.

DOCUMENTARY COUNCIL.

DOCUMENTARY ORGANISATION.

A resolution was passed at the Hamburg General Meeting not only urging shipowners to lend their support to the revision, strengthening, and consolidation of documentary organisation but also appealing to the protection and indemnity, freight, demurrage, and defence and other shipowners' organisations to spare no effort in creating effective machinery for this purpose. Pending the endeavours of the British clubs to have their memorandums of association altered, it has not been found expedient to take active steps in the matter.

ADHERENCE TO CHARTERPARTIES.

The endeavours of the documentary Council to have the agreed forms of charterparties respected have not been confined to bringing owners into line. Merchants and their organisations have also been approached, as it is considered that they are equally interested not only in having established fair and reasonable documents, but also in having the agreed charterparties respected and adhered to by both parties. As things are now, it happens that organisations of merchants, on behalf of their members, approve of charterparties issued on the understanding that the agreed terms and none but these shall be the basis for further chartering. Notwithstanding this, there are charterers who try to reserve for themselves special conditions, by infringing agreed documents, which their loyal colleagues do not insist upon. The granting of such special terms is detrimental both to owners and to the loyal merchants. Endeavours have been made to make the interested parties realise that the only way of combating such abuses, which should rightly be styled " disloyal competition," is to adhere strictly to agreed forms of charterparties and to take up a firm stand against offenders on either side.

STANDARD DOCUMENTS.

Although the Conference is an association of shipowners, the Documentary Council is fully alive to the necessity of meeting the requirements of the various trades served by shipping, and is concerned in introducing conditions which are fair and reasonable to owners and merchants alike. Charterparties established in pursuance of this policy facilitate chartering and other business transactions, reducing at the same time the prospects of disputes to a minimum. They also remove the possibility of one of the contracting parties feeling that it has been taken advantage of by the other, a feeling which is always fostered when one-sided charter conditions are imposed. Experience has proved that once an agreed form of charterparty has been introduced in a particular trade the interested parties would not in any circumstance consider a return to the former unstable state of affairs, which would leave it to merchants or owners individually to fix their terms for a particular voyage.

The Documentary Council, in pursuing this policy of stabilisation and unification, has been successful in entering upon negotiations with certain organisations of merchants who formerly looked upon the Conference with antagonism. Through friendly intercourse divergencies have been removed and the right atmosphere for the introduction of standard documents has been created.

WORK OF THE STANDING REVISION COMMITTEE.

During the past year the Documentary Council has dealt with several matters affecting shipping documents. The Standing Revision Committee has met frequently throughout the year, and where it has been considered necessary experts have been co-opted to assist with revision of charterparties. The gentlemen so co-opted have given freely of their time and experience, and sincere thanks are due to them for their valuable assistance to the committee.

Below is given a summary of the work of the committee on some of the charterparties which have been under consideration.

COAL CHARTERS.

During recent years the Polish coal exporters have introduced supplementary conditions to be used in conjunction with the Baltcon Charter. While it must be admitted that the conditions in this trade call for special stipulations for which the Baltcon Charter does not provide, it is considered that the object of some of the special conditions on which charterers insist is exclusively to burden owners with additional obligations which ought not to be borne by them and which, if accepted, may cause heavy losses to shipping. In order to have established fair conditions, the interested parties have been invited to attend a meeting for the purpose of discussing the possibility of adapting the Baltcon Charter to suit the requirements of the coal-carrying trade from Dantzig, Newfairwater, and Gdynia.

Another document which calls for attention is the charterparty used in the coal-carrying trade from German and Netherlands ports. The charterparties used in these trades are the "Deutkohle" Charter and the Rotterdam Coal Charter, issued by the Rheinische-Westfälisches-Kohlen-Syndikat. The Syndicate was recently approached with a view to commencing negotiations for an agreed document.

It has been intimated that it would be desirable to have the Baltcon Charter revised, but it is considered that the opportune moment has not yet arrived. There is, however, one point in connection with this charter on which useful work has been done. On being advised of the attempts made by certain charterers to infringe the stipulation regarding owner's broker at the ports of loading and discharge, the Standing Revision Committee applied to the Danish Coal Importers' Association to have the charterparty respected on this point. The association circularised its members, urging them to adhere to the charterparty in its entirety.

WOOD CHARTERS.

In the timber trade several charterparties call for improvements from the owners' point of view, such as, for instance, the charterparties used in the wood-carrying trade from the Baltic to Belgium, France, and the Netherlands. The attempts to have established reasonable conditions have so far been unsuccessful, but they have not been entirely in vain, as they have in some cases led to the removal of some of the conditions complained of.

The Baltwood Charter is, on the whole, working to the satisfaction of both owners and merchants. Recently a minor alteration in Clause 2 in regard to notice at the second and subsequent loading ports was agreed upon.

The Merblanc Charter has been for a long time on the list for revision, and it is hoped that the charterers will soon realise the advantage of an agreed document and resume negotiations.

GRAIN CHARTERS.

A new grain charter was issued by the New York Produce Exchange in October, 1928, under the name of North American Berth Grain Charterparty, which was to replace the charter hitherto known as the Baltimore Berth Grain Charter. Endeavours have been made with the object of having certain conditions modified, but the Exchange was not in favour of making further alterations, seeing that they had already agreed to several improvements in favour of owners.

The Australian Grain Charter has undergone a slight alteration in regard to slinging and overtime thereon. This new arrangement, which was made between the Documentary Committee of the Chamber of Shipping and the Australian grain exporters, has proved to work satisfactorily, and has, moreover, been instrumental in settling old disputes and removing the possibility of fresh ones on this point.

TIME CHARTERS.

The Documentary Council was invited to put forward suggestions for alterations in the form of time charter issued by the New York Produce Exchange, and the suggested alterations will be submitted to the New York Produce Exchange in due course.

ORE CHARTERS.

The majority of the ore charters now in use are very unfavourable to owners, but so far it has not been possible to have established satisfactory conditions in these trades.

FRUIT CHARTERS.

The conditions prevailing in the Spanish fruit trade are fairly satisfactory.

OTHER CHARTERS.

Under this category the kainite (potash) charterparties used for shipments from Hamburg, Bremen, and Antwerp have called for attention. The charterers have recently issued new forms of charterparties, which contain the same, and in some cases even worse, conditions as far as owners are concerned. Application has been made to the kali concerns in Germany and France for the purpose of ascertaining the possibility of establishing terms which are acceptable to both parties.

FINANCIAL STATEMENT, 1928.

According to a decision by the Board of Directors, the financial statement has undergone changes and appears now as an income and expenditure account and a balance-sheet.

The items of expenditure have been slightly re-arranged, and in some cases the headings have been altered. A new item has been introduced—namely, "Documentary Council"—which represents travelling and other expenses in connection with the meetings of the Documentary Council. These expenses were previously included in the Executive Committee expenses, but the two are now kept separate. In the item "Executive Committee and Sub-Committees" are included the expenses of the Finance Committee and the Emergency Committee, which are, however, very small.

The item previously called "Other Meetings" has been changed to "General Travelling" and covers expenses in connection with attendance at meetings of international organisations with which the Conference is co-operating, as well as travelling expenses of Conference officials in various matters requiring investigation. The travelling expenses in connection with documentary work are included under the heading "Standing Revision Committee."

The total income amounts to 232,089.32 kr., as compared with 236,170.58 kr. in 1927. The decrease is mainly due to reduction in income from advertisements. The total expenditure is 212,362.93 kr. as compared with 231,312.17 kr. in 1927. The saving is due principally to reduced meeting and printing expenses. The three items covering various circulars no longer appear, owing to the fact that all circulars except the monthly circular and the Information Bureau Circular are produced in the Conference office. The new arrangement involves increased expenses to material for duplicating, but on the whole a considerable saving has been effected on this point.

The balance-sheet is an innovation. The comparatively large amount of outstanding contribution is due to the fact that the accounts for owner-members can only be sent out towards the end of the year, and as a consequence the greater part of these amounts is only received at the beginning of the following year.

A rebate of 10 per cent. has been granted on the owners' and brokers' contributions for 1928, the same as for the preceding year.

Folkestone Harbour.

Following the Newhaven Harbour installation mentioned on page 274 of the July issue, we learn that a further large contract has now been placed by the Southern Railway Company with Messrs. Stothert and Pitt, Ltd., of Bath, comprising four large electric cranes and a 2-ton capstan for Folkestone Harbour.

Essential particulars of the cranes are given below:—

Two low-truck jib cranes with a lifting capacity of 4 tons at 55-ft. radius, running on travelling gantries of the semi-portal type 25-ft. 3-in. high, having a span of 69-ft. Separate motors actuate the hoisting, slewing, luffing, crane traversing and gantry travelling motions, and the jib luffing motion is designed on the "Stothert and Pitt" bell crank operated horizontal system.

One semi-portal gantry jib crane to lift 8 tons at 40-ft. radius, or 4 tons at 55-ft., the span of the gantry being 44-ft. 2-in. Four motors are to be fitted to this crane to operate the respective motions of hoisting, slewing, luffing and travelling, and, as in the case of the two cranes mentioned above, the "Stothert and Pitt" bell crank operated horizontal jib luffing system will be provided.

One low-truck "Loco" type jib crane for 4-ft. 8½-in. gauge track, with 40-ft. radius, to lift 6½ tons free on rails, or 10 tons with the assistance of blocking girders. Change gear is to be fitted on the hoisting motion to enable half-loads to be lifted at a quick speed, and the luffing is effected on the "Stothert and Pitt" horizontal rope-operated system. Separate motors actuate the hoisting, slewing, luffing and travelling motions.

All the cranes are arranged to slew on a ring of live steel rollers: the electric supply is direct current at 420 volts, and the contract is to be carried out under the supervision of the Company's chief engineer, Mr. George Ellson.

Ceylon and Indian Notes.

PORT TRUST FOR COLOMBO.

The creation of a Port Trust for Colombo is strongly recommended by the Committee of Representatives of shipping and bunkering interests appointed in January last to report on the subject. The committee, which had the services of Mr. T. H. Elderton, deputy chairman of the Calcutta Port Trust, consisted of Messrs. S. P. Hayley, A. S. Lampard, E. V. Cogliatti, T. W. Hockly, T. Hunt, A. R. Quarme, R. H. Skrine, and J. A. Tarbat.

Summarising the defects of the present system and the advantages of a Port Trust, the committee states:—

(a) No continuity of policy and administration. (b) The income derived from the port is paid into the general revenue of the Island, and funds are, therefore, not available for capital expenditure on the harbour as and when required. (c) Over taxation, as from the figures obtainable, the earnings of the port are considerably in excess of the capital and maintenance cost.

(a) An executive body with a permanent chairman would ensure continuity of policy and a progressive administration. (b) Money would always be available to carry out improvements as and when required. (c) The earnings of the port would be devoted either to its improvement or to the reduction of the port dues.

THE PRESENT SYSTEM.

On the defects of the present system the report states:—

The steady growth of the trade of the port has more and more brought to light defects inherent in the present administration. These, briefly enumerated, are as follows: (a) The consequence of the present system whereby the occupant of the post of chairman is the principal collector of Customs for the time being involves a frequent change in the chief executive officer of the port, and consequently a lack of continuity of policy and experience. This is the more serious in that the Port Commission are merely advisory, and all important questions of policy are referred for decision to the Government, the senior officers of which, as a general rule, have had little or no experience of the harbour, or even of the Customs Department. The functions of a body which is merely advisory and has no executive power or responsibility are inadequate to supplement these advantages. (b) The inclusion of the Port Commission Budget in the Budget of the Colony amongst those of a number of Government Departments means that the requirements of the port have to take their chance of a share in the revenue of the Colony in company with the demands of other departments for hospitals, irrigation schemes, roads, bridges, etc. No regard at present is paid to the fact that the port is contributing large sums to the general revenue. These are merged in the common resources of the Colony and are not ear-marked for the development of the port, which has, in consequence, year after year, to suffer the postponement of improvements long overdue for its effective working. As far as we are aware, in every other port in the Empire the income earned by the port is spent on either the improvement of the port or in reducing port dues. (c) A scrutiny of the accounts of the Port Commission as published indicate that the earnings of the port at the present time are considerably in excess of the capital and maintenance cost of the facilities provided for those using the port. This, the mercantile community cannot but regard as indefensible. The facts which indicate this over-taxation are enumerated in the following paragraphs:—

OVER TAXATION.

After quoting figures from the Port Commission accounts to show the port is being run at a heavy loss to Government, the report proceeds:—

It would appear that the accounts include all works paid for out of loans, including works no longer existing and works already paid off, and some works paid for out of revenue savings. Apparently, from the concluding paragraph of the chairman's administration report for the year 1927, and similar statements in previous reports, it has been the recent practice to exclude the last class of works, though this is not quite clear. Some works have certainly been included in the statement of special expenditure which could have been correctly charged to Capital. In any case, the omission to give any information in the accounts regarding the loans, from which the expenditure was met and the interest and sinking fund payments in respect of these loans, renders the accounts very obscure for our present purpose.

From a statement of the loans which have been given by Government for harbour works between, apparently, 1876, the year of the first Ordinance mentioned in the statement, and the 31st March, 1926, the date up to which the Sinking Fund was calculated, it appears that the total debt in 1926 was £2,412,522 plus Rs.533,444, and that the annual payments for interest and Sinking Fund amounted to £109,703 plus Rs.26,672. The average rate of interest payable on the capital debt is therefore about 3½ per cent., and the interest and Sinking Fund payments are costing Government Rs.1,489,379 per annum, converting the sterling portion of the payment into rupees at the exchange rate of 1s. 6d. The net revenue for 1926, according to the Port Commission accounts, was Rs.2,502,162, so that Government, after paying interest and Sinking Fund charges, were left with a surplus of Rs.1,012,783.

GOVERNMENT PROFIT.

The amount, representing over three per cent. of the capital debt, would certainly more than cover any allowance due for depreciation in excess of that already afforded by the Sinking Fund payments, so that it is clear that Government made a profit. The year 1926 was the worst of the four for which figures are quoted above, and Government must have made greater profits during the remaining three years. The only other year for which figures have been obtained is 1910-11, when the total expenditure, including interest and Sinking Fund charges, was Rs.2,552,597, against the actual revenue of Rs.2,625,040.

Assuming that the statement of loans is correct, and that all works, other than those paid for out of these loans, have been financed from savings on Port Commission account and not from the general revenue of the Colony, the above in itself justifies the statement that those using the port are now being overtaxed. The amount of Government's profit, or the extent of over-taxation is, however, greater than the figures given above would indicate, as Government are now having the free use of the port for which the mercantile community is paying, and are taking from harbour revenue contributions to the cost of their own departments.

ADVANTAGES OF TRUST.

Discussing the advantages of a Port Trust, the committee states:—

It is true that a Port Trust as compared with Government may have to pay a higher rate of interest on capital borrowings. The Harbour Commission of 1912 suggested that Government should charge interest at ¼ per cent. above the borrowing rate in the case of all loans as distinct from grants-in-aid. In the early days of the Calcutta Port Trust the Commissioners were only required to pay interest on Government loans at the rate at which Government had borrowed the money, but these loans were made when the port was faced with capital expenditure which was heavy compared to its revenue resources, and some measures of Government assistance was considered advisable. Other Indian Port Trusts have received similar assistance, but the general practice of to-day in India is for Government to charge ½ per cent. over and above their borrowing rate in the case of all loans to local authorities. Apart from Government loans, a Port Trust can raise money by issuing debentures. The Calcutta Port Commissioners can now borrow from the public at about ½ per cent. above the Government rate, and their debentures have become a readily marketable security. The position is much the same in Bombay, but Karachi and Rangoon have to pay more for their money.

PORT'S EARNING CAPACITY.

There is no doubt that the earning capacity of the port is greater than that revealed in the published accounts. Its only financial liabilities are the repayment of certain loans. According to the statement attached to his report, the outstanding loans amount altogether to £2,412,522 and Rs.533,444, on which Government are paying in interest and Sinking Fund charges £109,703 and Rs.26,672 per annum. It might be suggested that the Port Trust should pay to Government the interest and Sinking Fund charges until the loans are redeemed, in which case the payment would be as follows, converting pounds into rupees at 1s. 6d., say:—

	Rs. per annum.
1934 to 1940	1,489,379
1940 to 1944	1,321,139
1944 to 1951	593,086
1951 to 1959	445,788
After 1959	nil

BASIS OF TRANSFER.

The fact that the accounts have not been kept on a commercial basis renders it impossible to make any accurate estimate of the true financial position, states the committee in suggesting a basis for the transfer to a Port Trust. The committee consider that if normal charges were levied on Government goods, additional revenue due to the Customs for collecting charges against the amount by Government towards the Master Attendant's staff and the cost of maintaining Government property and rent for Government buildings, are still with reductions on the expenditure side on account of the Police and Port Health Departments. Government could not reasonably refuse to pay at least three-quarters of the former and the whole of the latter, in which case the expenditure would be reduced by Rs.145,125. According to these figures the nett revenue would be increased by Rs.295,125.

The argument might well be advanced that, in view of the fact of the trade of the port having been over-taxed to the extent indicated, Government have already been repaid every-

thing they have spent on the port, and they should therefore be ready to hand over to a Port Trust free of charge. The figures given refer to the position as it would have been in 1926, but the calculation of the cost of the first method, if the transfer were made, say on 1930, would be a simple matter. As regards the second method, it would be necessary to ascertain the present value of the securities now held in the Sinking Funds, and make the estimate of the accumulations up to the probable date of transfer. It may be suggested that a lump sum price would be the most satisfactory method of settlement, and, if the loan account represents the total of the real advances from Government, it affords a suitable and convenient basis for determining a price.

KARACHI'S FOREIGN TRADE.

The statistics of foreign trade of the Port of Karachi for May just available show that the total value of imports amounted to Rs.2 crores 17 lakhs (a decrease of Rs.52 lakhs), and that of exports Rs.2 crores 48 lakhs (a decrease of 10 lakhs), compared with the figures for the corresponding month last year. Progressive totals for the two months—April and May—show a decrease of Rs.1 lakh under imports and 52 lakhs under exports, compared with the corresponding period of the previous **year.**

The principal decreases in imports during May compared with the corresponding month last year occurred under cotton manufactures, valued at Rs.76 lakhs (a decrease of 71 lakhs), metals Rs.12 lakhs (a decrease of Rs.6 lakhs), and oil Rs.3 lakhs (a decrease of Rs.5 lakhs), while increases occurred under sugar, 15,000 tons, Rs.26 lakhs (an increase of 15,000 tons, Rs.26 lakhs) and wheat, 6,700 tons, Rs.10 lakhs (an increase of 6,700 tons, Rs.10 lakhs) in exports. The principal decreases occurred under barley, 100 tons, valued at Rs.14,000 (a decrease of 42,000 tons, Rs.11 lakhs), wheat 58,000 tons (a decrease of 9,000 tons, Rs.23 lakhs), wheat flour 2,100 tons, Rs.4 lakhs (a decrease of 2,100 tons, Rs.4 lakhs), wool 500 tons, Rs.10 lakhs (a decrease of 700 tons valued at Rs.13 lakhs), and raw hides 400 tons valued at Rs.5 lakhs (a decrease of 300 tons, Rs.5 lakhs).

BOMBAY PORT TRUST FINANCES.

At a meeting of the Trustees of the Port of Bombay, held on July 2nd, the happy announcement was made by the chairman that, subject to final audit, the working result of the financial year ending 31st March, 1929, of the Bombay Port Trust, was a surplus of Rs.595,414 as against the budgetted surplus of Rs.58,595. The revenue receipts for the year under review, excluding pilotage and special receipts, were Rs.28,075,165 or Rs.559,565 in excess of the Budget expectations, and constituted a record in the history of the Trust. Expenditure amounted to Rs.27,479,751, or Rs.22,746 only in excess of the Budget figure.

In commenting on the satisfactory result of the year's working, the chairman drew attention to the close approximation between the budgetted and the actual expenditure, which, he said, had been effected by rigid economy in all departments in spite of several increased grants having to be sanctioned for items not foreseen when the Budget was framed. He also invited reference to the cost of the working of the Port Trust railway, which had been reduced by drastic retrenchment from 27 lakhs six years ago to some 17 lakhs last year. The receipts, on the other hand, had risen from Rs.23 lakhs to Rs.29 lakhs during the same period; the net improvement was, therefore, nearly Rs.16 lakhs per annum, and the railway was now beginning to cover its overhead capital charges and pay its way.

BOMBAY PORT TRUST'S PRINCIPAL SOURCE OF REVENUE FOR 1929-30.

The Bombay Port Trust's principal source of revenue is the wet docks. The receipts under this section showed an improvement of 5½ per cent. in 1927-28 over 1926-27, and the revised budget for 1928-29 and the budget for 1929-30 show a further improvement of approximately 5 per cent. and 2 per cent. respectively. The figures are as follows:—

Actual in 1926-27, Rs.14,234,356; actual in 1927-28, Rs.15,029,493; revised Budget for 1928-29, Rs.15,699,400; Budget for 1929-30, 15,974,900.

The quantity of goods handled at the docks increased by over one million tons in 1927-28, and a further increase of 386,000 tons is expected this year. The figures are as follows:

1926-27, 4,068,000 tons; 1927-28, 5,086,000 tons; 1928-29, *5,472,000. (*Revised Budget).

The figures for 1927-28 were indicative of a fairly heavy increase in trade other than cotton, as cotton experts in that year were the lowest since 1920-21.

A slight increase is expected next year under the head of bunders, due to improved petrol imports, but the revenue is, of course, considerably lower than 1927-28 owing to the large reduction in wharfage in petrol. Receipts from land show an increase, as several renewals of leaseholds at higher rates are expected next year. It has been alleged in certain quarters that lease renewals are being forced on tenants at exorbitant rates. This, of course, is not true.

CALCUTTA PORT ENGINEER HONOURED.

His many friends in England will rejoice to hear that the King has been pleased to confer on Mr. J. McClashan a C.I.E. Mr. McClashan is the chief engineer of the Calcutta Port.

CALCUTTA PORT TRUST'S CHAIRMAN HONOURED.

The King has also been pleased to confer on Mr. S. C. Stuart Williams, chairman of the Calcutta Port Trust, a Knighthood with effect from June last.

COLOMBO PORT MATTERS.

Mr. S. P. Hayley, member of the Colombo Port Commission and chairman of the Ceylon Chamber of Commerce, sailed by the " Cheshire " for England, on leave, in the first week of June.

Mr. G. W. Dodds, the Colombo harbour engineer, also sailed for England by the same boat.

TRADING IN COLOMBO HARBOUR.

The question of trading in steamers in the Colombo Harbour has been referred to the Colombo Continental Conference, which represents the interest of all shipping companies in Ceylon.

It will be recalled that the Freight Conference refused the application made by the Ceylon Workers' Federation on behalf of the traders on the ground that no exceptions could be made. The Workers' Federation made another appeal to Mr. S. P. Hayley, the chairman of the Ceylon Chamber of Commerce, and he informed them that the matter would be considered by the Colombo Continental Conference.

Our Changing Lighthouses.

Revolutionary changes in the operation of the Empire's lighthouses are being effected by the increasing adoption of electrical power. A striking example of the benefits conferred by electricity when used for lighthouse, coastguard, and signal station service, even in remote waters, is to be found at Tiri Tiri Island, in the Hauraki Gulf, about 16 miles from Auckland.

The New Zealand authorities maintain a lighthouse and signal station on the island, and a 24-hour watch is kept for reporting ships approaching the port, as a pilot is compulsory for all overseas vessels. Immediately a ship is signalled it is reported to the port, and a pilot is sent out in a pilot boat which, being equipped with wireless, is enabled to maintain contact with the approaching vessel.

In the past communication with the port was maintained by telephone, and the arduous life on this lonely outpost was not much ameliorated by the light of kerosene oil lamps in the keepers' houses; but the Auckland Harbour Board has now installed an electric light and wireless plant at Tiri Tiri Island. This power plant enables wireless telegraphy to be used for communication with the port and for morse signalling to ships, and also ensures an unfailing supply of electric light for the keepers' houses. The generator, of course, is not in continual operation, as a chloride battery consisting of 16 cells provides a reservoir of ample capacity for the storage of current.

The Tiri Tiri lighthouse was erected in 1864 by the famous lighthouse builders Chance Bros., of England. Originally it had a fixed light with a kerosene lamp; later it was altered to kerosene vapour lamp of the gas-mantle type; and this was replaced by a modern gas flashing lamp with a sun-valve control.

The most recent development in English lighthouse practice again rendered possible by the reliable storage of current in chloride batteries, is the erection of coastal wireless beacons which send out distinctive wireless signals at regular intervals, enabling vessels fitted with wireless direction-finders to take bearings on the beacon stations and accurately to determine their position.

NEW HARBOUR BRIDGE AT HALIFAX, NOVA SCOTIA.

Plans and specifications have been submitted to the Department of Public Works at Ottawa for the projected bridge across Halifax harbour, linking Halifax and Dartmouth. This undertaking has been actively supported for a number of years, and the Halifax-Dartmouth Bridge Company has been incorporated with a view to carrying out the enterprise. Technical and legal preliminaries have now been almost completed.

The proposal is that the viaduct be built at the narrows, where the shores of the harbour proper converge to the channel that leads into Bedford Basin. A 150-ft. clearance above high water is provided for in the plans, giving ample room for ships, while the centre span would be 960-ft. between the main piers. At present the harbour is crossed by ferry or by the highway skirting Bedford Basin. The bridge would cut about 20 miles off the highway to Dartmouth and south-east coast points.

Modern Apparatus for Converting Alternating to Direct Current.

MERCURY ARC RECTIFIERS.

DURING recent years, when alternating current has been developed to such a large extent for long-distance transmission, considerable attention has been directed to improving the efficiency of converting equipment, for there is still a wide field for direct current, particularly in electric railway operation, tramways, rolling mills, conveyors, electrolysis and special applications.

One of the most interesting of modern developments is the mercury arc rectifier, which is a device in which the electronic valves select the positive portions of the a.c. waves and adds them, side by side, thus creating a slightly undulatory d.c. without the intervention of either rotating masses or of a magnetic circuit as connecting links. In this manner an improvement of the efficiency of conversion is obtained, which, for d.c. pressures ranging from 500 to 3,000 volts, is 95.5 per cent. to 99.2 per cent. The rectifier has also the advantage of having a practically constant efficiency between no-load and full load.

In the mercury arc rectifier, an electric arc burns between an iron electrode and a mercury electrode, in a chamber in which a very high vacuum is maintained. The diagram in Fig. 1 shows the principles on which the rectifying phenomena of such an arc are based. Suppose switch S to be open and the d.c. potential E to be slowly increased from zero. When E has reached and exceeded a certain value, E1, a very weak discharge, a corona effect, of the order of a few milliamperes, takes place between the two electrodes; further, the lower the pressure in the chamber, the higher the potential at which the electrical discharge takes place (about 400 to 15,000 V. as the vacuum varies from 0.1 to 0.0005 mm. Hg.). If, now, the potential E is increased, the corresponding increase in current is very slight. Even for potentials varying between 20 and 50 kv., the current is seldom higher than 10 milliamperes. If, however, the potential is still further raised, at a given value a sudden change takes place, the current increases suddenly and the potential across the arc drops from the value of 20-50 kv. to about 20 V. The strength of the current which now flows in the circuit is limited principally by the value of the exterior resistance r. It is characteristic of the conditions now existing that as the current is increased (between about 50 and 1,000 A) the pressure e across the arc slightly decreases. The curves of Fig. 2 are obtained by plotting in a co-ordinate system the values of the pressure e as a function of the current i. These curves form the characteristic of the arc.

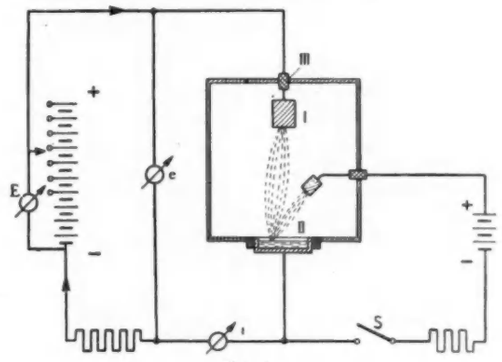


Fig. 1.

I. Iron.
II. Mercury.
III. Bushing Insulation.

This sudden jump in the strength of the current is explained if a given battery pressure E is admitted and the different values of current and pressure corresponding to a given resistance r of the external circuit are introduced into the diagram. These values of current and pressure are on a straight line (the resistance characteristic); the inclination of this to the current axis is equal to r. The points where this resistance line intersects the characteristic of the arc gives the conditions under which it is possible for the arc to occur. It will be seen that all these points in which the inclination of the characteristic is steeper than that of the resistance line correspond to unstable operation.

If the pressure E is gradually diminished the values of e and i follow the same characteristic, but in the opposite sense. Once the apex of the curve has been surmounted the region of the corona effect is reached again, and, somewhat below the potential at which the discharge began, the arc ceases. If, now, we go over to negative values of pressure E, that is to say, if we turn the iron into the " cathode " and the mercury into the " anode," a similar sequence occurs, with the only difference that all the pressures are slightly greater.

Matters assume another aspect, however, if an auxiliary arc is combined with the one just considered and in such a manner that both arcs have a common mercury cathode. This result is obtained by closing switch S. The arc characteristic then assumes the form shown by the dotted line in Fig. 2. If the pressure E is constantly increased in the positive sense, a current

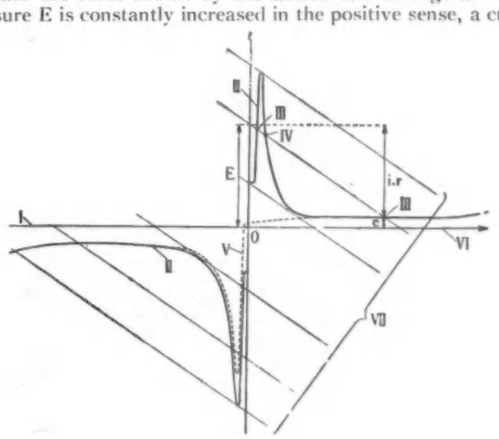


Fig. 2.

which produces an arc will be observed to flow at a low value of the pressure, between about 40 and 100 V according to the resistance r. When the pressure E is gradually reduced, nothing of note is observed. Of fundamental importance, however, is the fact that the negative branch of the characteristic remains practically unaffected by the auxiliary arc, and it is on this property that the rectifying quality of the mercury-iron arc is based. If, instead of a battery, an alternating-current generator is used to feed the arc, the above considerations make it clear that a strong current will only flow during that part of the pressure wave which constitutes the mercury as cathode and the iron as anode, this on condition that the maximum value of the pressure wave is lower than the apex of the negative branch of the pressure characteristic in Fig. 2. This is, in practice, always the case, and the result is a series of current impulses in the same sense separated by pauses during which practically no current flows. At the best, the uneven direct current which is thus created can only be used for battery charging and electrolytic purposes. For practical requirements, it is necessary to connect up several arcs in a suitable manner. Fig. 3 shows how this is done for " two-phase " and Fig. 4 for " three-phase rectifiers."

These connections have the advantage that a series of unbroken current impulses all in the same sense are caused to flow through the outer circuit; with connections made as in Fig. 4 the flow is really a direct current one with a small alternating-current component superimposed.

As previously stated, the negative branch of the characteristic is scarcely affected by the presence of another arc, so that, with the connections shown, there is hardly any " reverse current " flowing through the anodes during the period of pause when they are at a negative potential if compared to the mercury.

The mercury-arc glass rectifier was invented by Cooper-Hewitt, about twenty years ago. Since he produced the first experimental glass rectifier, the process of manufacture has been perfected, so that this type of apparatus is, to-day, quite reliable for low pressures and has been built for currents up to 250 A at a direct-current pressure of 250 V. Certain difficulties, inherent to the use of glass, limited the current handled by this type of rectifier, and metal receptacles had to be substituted in units for large output. The transition from glass rectifiers to metal rectifiers presented certain serious difficulties, one of the greatest being to make the electrodes gas-tight although composed of several parts. Once this problem of a gas-tight weal for the electrode bushings in metal receptacles had been solved, the main constructive difficulty in the way of building power rectifiers had been overcome.

The Brown Boveri power rectifier is sub-divided into an arc chamber and a condensing chamber. The insulated mercury cathode is located in the centre of the bottom of the arc chamber or cylinder. This cylinder is closed, above, by the massive anode plate. The six main anodes are set off in a circle on the anode plate, each having its insulating bushing. Besides the main anodes, there are two smaller excitation anodes which maintain the cathode spot through a single-phase alternating-current circuit, independently of the main current. In the centre of the anode plate, the condensing chamber, shaped like a cylindrical condensing dome, is mounted; this is closed by a cover plate. The upper portion of the rectifier, composed of the condensing dome and anode plate, can be raised from the arc cylinder to enable the interior of the cylinder to be inspected or repaired if necessary. All joints and bushings must be made tight against the high vacuum and are fitted with the Brown Boveri seal mentioned above.

The electrode bushing, patented by Brown Boveri, consists of an asbestos ring placed in the machined recess of a plate (anode plate, for example). This ring is compressed by a bushing insulator. The mercury forming the seal is closed by a rubber ring, held down by a ring. The seal can be filled through a mercury gauge. This mercury seal allows vacua as high as 0.005—0.0001mm. of mercury, necessary for power rectifier to be attained and maintained. The suitability of the seal used for the electrode bushings of Brown Boveri power rectifiers is proved conclusively by the fact that cylinders which have been exhausted and then left untouched for months retain a vacuum of 0.02—0.03 mm. Hg. Before despatch, all cylinders are tested several times and are only passed as tight when, after being left cold for 24 hours, the vacuum in the cylinder has not dropped below 0.005 mm. Hg.

The accessories for the mercury arc rectifier consist of a transformer, an absorption choke coil, an anode choke coil, distribution choke coils and cathode choke coils, a starting-up device and a vacuum pump set.

Starting up a rectifier plant is a simple matter. It is not necessary to determine polarity; no synchronising devices are required. In the connections of a rectifier plant the conductors are led from the busbars by way of isolating switches, over an oil switch, having built-on main current relays, to the terminals of the primary winding of the main transformer. The secondary winding of the latter is generally six-phase. The two neutral points are connected to the absorption choke coil, the middle conductor of which forms the negative terminal of the direct-current system. The six phases of the secondary winding of the main transformer are connected to the corresponding anodes of the rectifier. From the cathode which forms the positive pole of the direct-current busbar, after passing over an ammeter, an automatic direct-current switch and isolating switches.

An auxiliary transformer is connected to the high-pressure busbars to supply all the auxiliary circuits. This transformer is protected on both primary and secondary side by fuses. The auxiliary busbars can be isolated by means of a triple-pole lever switch. The excitation transformer is fed by these bars through a switch, interlocked with an oil switch, through the fuses and an ammeter. The two excitation anodes of the rectifier are connected to the two outer conductors of the secondary side of the excitation transformer. The secondary side neutral point of the excitation transformer is connected to the cathode of the rectifier after passing through an excitation choke coil, excitation resistance, relays and fuses.

The auxiliary busbars supply the driving motors of the circulating pump and the vacuum pump, through lever switches and fuses. The ignition device is connected to the two outer leads of the excitation transformer, through a relay and the ignition resistance. The hot plate of the vacuum pump is supplied from the auxiliary busbars, through the transformer. A voltmeter is used to measure the direct-current pressure of the rectifier.

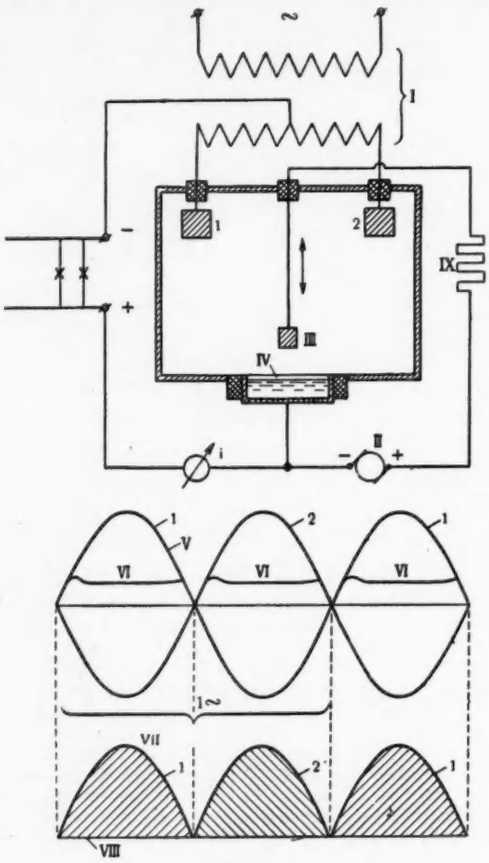


Fig. 3.

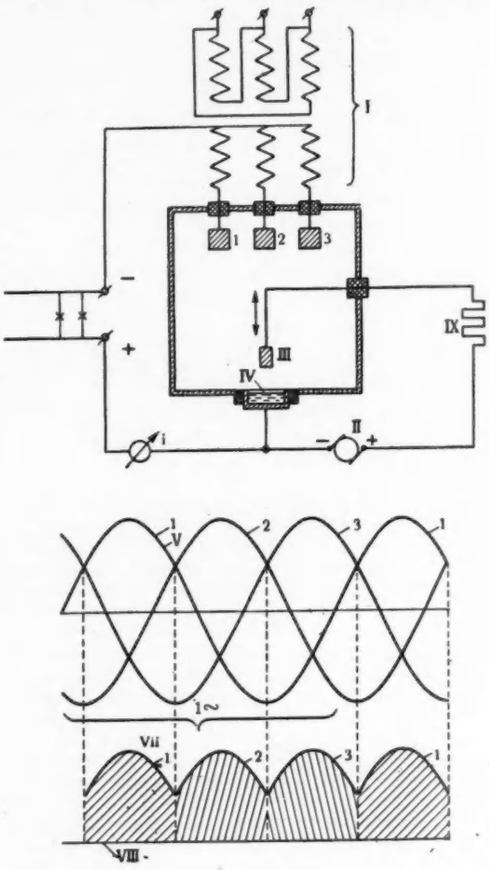


Fig. 4.

I. Transformer; II. Ignition converter; III. Ignition anode; IV. Cathode; V. Phase pressure; VI. Arc pressure; VII. Current cycle; VIII. Cathode current; IX. Resistance. 1, 2, 3, Anodes and corresponding current curves.

A power rectifier is set to work in the following manner: Switches are closed, thus starting up the circulating water pump and the vacuum pump. After the cooling water for the high-vacuum pump and for the rectifier has been turned on, the pressure in the cylinder is measured by means of the vacuum gauge. Then the oil switch is closed, the rectifier automatically ignited and excited. After this, the automatic switch is closed. The rectifier is now ready for service. These switching operations are accomplished in a few seconds. If the rectifier set is composed of two rectifiers and only one transformer, setting to work is similar to that described for a single-cylinder plant. During the first months that the rectifier is in service it is necessary to take a reading of the vacuum from time to time, which should be 0.001 to 0.005 mm. of mercury column.

Messrs. The British Brown-Boveri Co., Ltd., inform the writer that they are now making single units to deal with as much as 16,000 amps., and are able at the same time, in their high-tension types, to go to 16,000 volts D.C. in single units.

Fig. 5 shows the connections for an Oerlikon mercury arc rectifier equipment. One of the interesting features of the Oerlikon rectifying plant is the automatic vacuum cock used (see Fig. 6). This consists of an ordinary cock with mercury packing actuated by a revolving piston mounted on it with a strong return spring. Fig. 6 shows the arrangement of gear. The mode of operation is as follows: Once the motor has been started and run up to normal speed, the forced-oil pump produces the necessary oil pressure for turning the automatic cock. After being turned half a revolution, the cock is open and is kept in that position, against the force exerted by the spiral spring, by the oil pressure. If, for any reason, the motor

stops, as a result of the failure of current, for instance, the oil pressure disappears and the spring closes the vacuum cock immediately. In order that the closing motion should be as rapid as possible, in spite of the back pressure of the escaping oil, there is in the pressure pipe, on the side of the vacuum pump, a change-over valve, which affords immediately a free outlet for the oil from the revolving piston, in the event of a reduction of pressure in the forced-oil pump. The arrangement is further very simple, as the oil of the rotary oil pump is used for operating the cock.

Fig. 6 shows the connections for the automatic ignition and excitation of the rectifier in conjunction with the operation of the high-speed circuit breaker. The switching process is as follows: When the main transformer of the rectifier is switched on, the excitation transformer, which is connected to three secondary phases of the transformer, is put under pressure. The ignition coil of the rectifier, which is connected to the secondary terminals 4 and 5 of the excitation transformer and is mounted on the ignition device, is thus excited and forces the plunger down to the level of mercury. As a result of the contact between the plunger and the cathode mercury, the current flows from the terminal 4 of the excitation transformer through the ignition relay; the latter comes into play and interrupts the current of the ignition coil, thus causing the release of plunger. After the arc, which has served to ignite the rectifier, has been interrupted between the plunger and the cathode mercury, the ignition relay ceases to act and the ignition process starts afresh until the excitation of the rectifier has set in. This automatic repeated excitation is very reliable, and is used for all Oerlikon rectifiers. A pilot lamp is provided which lights and goes out with the excitation and thus provides a means of ascertaining that the ignition device is working correctly. It is not possible to regulate the pressure in mercury arc rectifiers themselves because the ratio of alternating to direct-current pressure is constant. The direct-current pressure can, therefore, only be altered by varying the alternating-current pressure by a corresponding amount. To do this, either induction regulators, for gradual regulation or else tappings on the transformer, for step regulation, are used. Lately, in most installations a tendency to do without compounding and over-compounding has been evident, thus making the converter plant simpler and more adaptable. Pressure regulation is, however, still very frequently necessary in order to be able to suit the plant to variable conditions of service and also to allow of distributing the load advantageously by regulating the rectifier, if this is operating in parallel with rotating machinery. As a rule, a few tappings only, on the transformer, suffice for this.

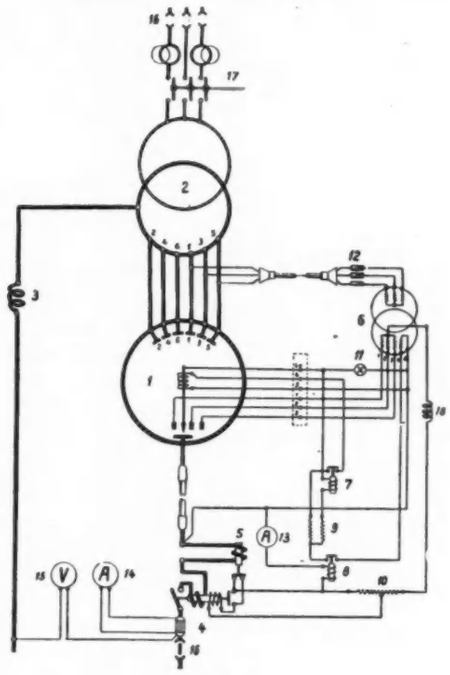


Fig. 5.

KEY:

1. Rectifier; 2. Main transformer; 3. Cathode choking coil; 4. D.C. circuit breaker; 5. Minimum current relay; 6. Excitation transformer; 7. Ignition relay; 8. Ignition interruption relay; 9. Ignition resistance; 10. Excitation resistance; 11. Lamp for checking ignition; 12. Fuse; 13. Excitation ammeter; 14. D.C. ammeter; 15. D.C. voltmeter; 16. Isolating switch; 17. Oil circuit breaker; 18. Excitation choking coil.

As a static converter, the rectifier is very suitable for service without supervision, since this static apparatus really calls for no constant attention. Further, the very simple operations requisite for putting the rectifier into and out of service and the little supervision called for, make the substitution of operators by automatic equipment seem very attractive. It is a very simple matter to make such a plant entirely automatic.

An oil switch with motor remote control commences the operation of putting the rectifier into service. This oil switch can either be controlled from a clock or by relays depending on the pressure or on the load, etc. Ignition, excitation and the closing solenoid of the direct-current switch are all put under pressure and made to work in the proper sequence by contacts on the oil-switch spindle. This terminates the switching-in process. The vacuum pump is controlled independently of the

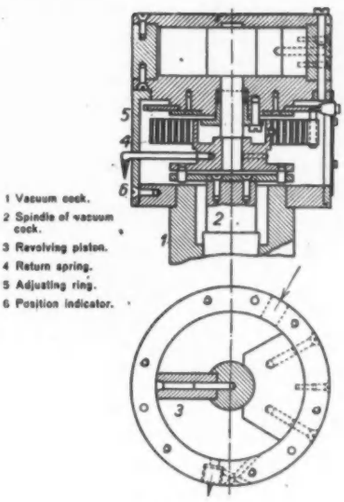


Fig. 6.

above switching operation, in accordance with the vacuum existing in the cylinder. A contact thermometer on the anode plate prevents the rectifier from getting too hot. Supervision, which is mainly concentrated on control of the vacuum and the temperature, thus becomes superfluous. Shutting down the plant is also done by the oil switch, the contacts of which cause the direct-current switch to trip, and cut off the pressure from the other apparatus.

Owing to their great simplicity, rectifier plants can be equipped automatically at a relatively small increased cost. This extra cost is soon repaid by the saving on the salaries of the operators. A large number of automatic rectifier stations which have been in service for long periods, show the practicability and reliability of their automatic equipment.

The field of application covered by the rectifiers is very wide. They can be employed as converters wherever direct current is needed. They are, of course, employed more advantageously in plants where their particular qualities coincide with the requirements of the service supplied. To this class of service belong systems which are subject to big fluctuations in load and to heavy current peaks, such as main lines, tramways, rolling mills, conveyors, etc. On account of the rectifier being able to stand up to large momentary overloads of 200—300 per cent. above the normal load, the continuous output can be considerably lower when rectifiers are used and the efficiency correspondingly better. As, further, the efficiency of the rectifier including the transformer is very high at partial loads, the daily efficiency in plants of this kind equipped with rectifiers reaches a value absolutely unattainable by other types of converters. These advantages are the more marked the higher the service pressure, as the rectifier efficiency increases with the pressure. The rectifier is therefore the ideal converter for railway service at high direct-current pressures.

For low pressures as well, however, for supplying light and power systems, the rectifier has found wide application. In such cases it has been given preference over other types of converters principally on account of its simplicity of operation, the little supervision required, noiselessness, and absence of wear. In three-wire systems the rectifier is generally connected to the outer mains, in order to utilise it more advantageously and to raise the efficiency. In such cases the distribution of the pressure is taken care of by a small rotary set. If, however, a rotary set is undesirable in the plant in question, two rectifiers in series can be used to look after the distribution of pressure.

The many applications which have been found for rectifiers within a relatively short period are due to the qualities of this apparatus, the principals of which are:—(1) A high efficiency, which remains constant at all loads; (2) insensitivity to large overloads of short duration and also to short-circuits; (3) easy setting to work and supervision; (4) the absence of any kind of wear, as there are no rotating parts, resulting in an infinitesimally small outlay for upkeep; (5) its light weight, no foundations or expensive lifting gear are required; (6) its small overall dimensions; (7) its noiselessness.

The Port of New York.

VALUE OF COMMERCE AT THE PORT OF NEW YORK.

The latest available figures issued by the local office of the United States Department of Commerce show that, for the month of May, 1929, exports amounted to $132,846,000, as compared with $149,986,000 for May, 1928. This is the first month of this year in which the value of exports through the Port of New York failed to show an increase over the corresponding month of 1928.

Imports, on the other hand, again showed a considerable increase, 19.5 per cent. over the preceding May, and a much larger gain than that for all ports of the United States, which increased only 12.7 per cent. In May, 1928, the value of imports through the Port of New York amounted to $157,762,000, while this year it had increased to $188,511,000.

In the exports through the Port of New York for the preceding month of April, 1929, which showed a gain of 20 per cent. over April, 1928, increases were well distributed among a widely diversified list, manufactured and semi-manufactured goods showing the largest gains. The largest gain in dollar volume was made by the group of copper manufactures, the percentage increase over April, 1928, being 54.5. Rubber manufactures (except automobile casings) increased by more than 45 per cent.; automobiles and parts by more than 35 per cent.; industrial machinery by 35 per cent.; packing house products and iron and steel manufactures by more than 20 per cent. On the other hand, raw cotton showed a decline of $2,400,000 or 60 per cent., and furs and fur manufactures 20 per cent.

Apples continue to be exported in large volume. For the month of April, 1929, the value of the apples exported amounted to more than ten times the value of those shipped in April, 1928.

VOLUME OF FOREIGN TRADE.

The latest available figures on the volume of cargo handled in overseas trade are for the calendar year, 1928. In that year 9,693,639 long tons of such cargo moved out in export trade as compared with 10,461,159 long tons in the previous year. Imports amounted to 10,480,246 long tons as compared with 10,531,700 long tons the year before.

The decline in export tonnage was accompanied by an increase in export value, the reason for which may be summed up in a sentence. In 1928 more automobiles and less grain and petroleum products went out through the Port of New York.

VOLUME OF INTER-COASTAL TRADE.

According to the latest available figures on inter-coastal trade, compiled by the United States Shipping Board, the volume of receipts at the Port of New York from Pacific coast ports for the calendar year 1928 amounted to 3,058,436 long tons, as compared with 3,821,906 tons the previous year. Practically the entire decline results from reduced receipts of petroleum and products from Los Angeles, experienced not only by the Port of New York, but by all of the ports on the Atlantic coast. Shipments from New York to the west coast amounted to 605,131 long tons in 1928 as compared with 587,398 long tons in 1927.

COMMERCE AT PORT NEWARK.

In the month of May, 1929, 50,611,000 board feet of lumber and 6,800 tons of general cargo were brought into Port Newark by 55 vessels, lighters and barges, as compared with 50,817,000 board feet of lumber and 13,250 tons of general cargo brought in by 57 vessels, lighters and barges in May, 1928.

GRAIN MOVEMENT.

According to figures furnished by the United States Department of Commerce there were 4,193,000 bushels of grain exported through the Port of New York in April, 1929, whereas in April, 1928, there were exported 5,845,000 bushels. An analysis of the movement of grain through United States and Canadian ports points to a marked diversion from New York to Montreal, both of domestic and Canadian grain.

VESSEL MOVEMENTS IN FOREIGN TRADE.

Vessel entrances and clearances for May, 1929, continued to show increases over the same period in 1928. There were 653 clearances and 617 entrances in May, 1929, as compared with 597 clearances and 589 entrances in May, 1928, representing increases of 9.4 and 4.8 per cent. respectively.

The tonnage of vessels cleared in May, 1929, amounted to 2,831,267, and of those entered to 2,662,862, as compared with 2,485,965 cleared and 2,529,046 entered in May, 1928, the percentage increases being 13.9 and 5.3 respectively.

STEAMSHIP SAILINGS.

The total of all sailings from the Port of New York showed a slight increase for the month of May, and this was registered in practically all types of services. Foreign sailings in regular services increased 5 per cent. over the month of April despite an approximate 10 per cent. reduction in Caribbean-Mexican departures. This reduction is seasonal and is offset by increased sailings to Canadian Atlantic ports.

Saturday, May 4th, was the peak day of the month with a total of 102 sailings. Of these, 61 were in foreign service and included 15 sailings in the Caribbean-Mexican route. The balance of 41 sailings were in domestic service.

In checking the sum of the sailings on foreign trade routes with the clearances of vessels in foreign trade, shown above, one must bear in mind that the clearances include, in addition to regular sailings, special cruises, tankers and vessels clearing for domestic ports with residue of foreign cargo or in ballast. Inasmuch as a vessel may not sail for one or two days after the clearance papers are issued, there may be a small difference in the two totals.

INTER-COASTAL STEAMSHIP SERVICES.

The Panama Pacific Line announced the launching of their new liner " Pennsylvania " at Newport News, July 10th. This is the largest merchant vessel ever built in America, and it will enter the New York--San Francisco service some time in the fall. She is the third of six new vessels which will eventually operate on a schedule calling for weekly sailings, and it is designed to carry over 800 passengers.

NEW YORK STATE BARGE CANAL.

On June 20th there was launched at Ogdensburg, New York, the motor ship " Empire State," for operation between the Atlantic seaboard and Great Lakes ports via the Hudson River and the New York State Barge Canal. This new unit has been especially designed for canal-lake operation, being 254-ft. long, 43-ft. 6-in. beam and 20-ft. deep. It will be propelled by two 700-h.p. twin Diesel engines of the latest type, which will enable it to make the trip between Lake Erie ports and the Port of New York in five days. At a draft of 10-ft. it will have a capacity of 2,000 tons, and it is contemplated that steel products will be carried eastbound from the Cleveland district and sugar or sulphur westbound from New York. According to the Inland Waterways Transportation Company, of Buffalo, N.Y., who will operate this new motorship, this service will be augmented by additional vessels of similar type and capacity as quickly as they can be constructed.

PIERS.

Perth Amboy is taking on additional activity since the locating of the Shell Eastern Products Corporation at Sewaren, and the Crew-Levick Company, of Philadelphia, on a Meredith tract adjoining the Lehigh Valley Railroad. The Shell plant can provide for six tankers at one time.

The Hudson River Night Line has applied to the Dock Department for permission to extend its pier at the foot of Canal Street approximately 200-ft. further out into the Hudson River. This extension is necessary to take care of the increased tonnage now being handled. To avoid delays to trucks or congestion on the pier, additional handling and receiving facilities have been installed.

DRY DOCKS.

An efficient repair job was recently performed at the Morse plant of the United Dry Docks, when the badly-damaged bow of the steamship " Cristobal Colon," which was in collision May 2nd with the steamer " River Orontes " off quarantine, was restored to a seaworthy condition. During the four days in dry dock more than 1,000 passengers remained aboard, and by means of arrangements made by the Morse engineers all sanitary and other equipment of the steamer was maintained in normal operation.

WAREHOUSES.

At the end of April, 1929, the United States Department of Commerce reported that public merchandise warehouses in New York State were occupied to the extent of 74 per cent. of capacity, and those in New Jersey to 78 per cent. of capacity, while for the entire country the average occupancy stood at 72 per cent. This compares with 62 per cent. occupancy for New York, 76 per cent. for New Jersey, and 70 per cent. for the entire country in March.

New York is the centre of a number of commodity exchanges dealing in contracts for future delivery of such raw materials as cotton, coffee, sugar, cocoa, silk, hides, metals, rubber and burlaps. Practically all of these exchanges specify delivery at the Port of New York in their contracts and maintain a close supervision over the character of storage facilities in which certified stocks are held. A number of them maintain statistical departments which collect and issue to members or to the public in general current statistics on the movement and stocks of commodities in which they deal. In other cases this statistical information is collected by commodity trade associations or private intelligence organisations.

Through the courtesy of the statistical departments, the Bureau of Commerce receives reports of stocks in storage at the end of each month. The figures for June, 1929, show increased stocks in storage of cotton, silk, sugar and cocoa, as compared with the corresponding month in 1928, and smaller stocks of

coffee. Comparative statistics for the month of June for the two years are as follows:

	June, 1929.	June, 1928.
Cotton (square bales) ...	160,564	72,519
Silk (bales)	47,425	41,127
Sugar (bags)	2,496,156	2,362,705
Cocoa (bags)	524,234*	379,773*
Coffee (bags)	569,160	722,175

* These figures include an estimated 75,000 bags in unlicensed warehouses.

SUGAR STORAGE.

Warehouses in the Port of New York were successful in meeting demands for an unprecedented seasonal peak storage of raw sugar in June. On June 27th the stocks in storage reached a total of 2,497,957 bags, an increase of 135,000 bags over the corresponding date in 1928. Despite the heavy demands for space, a survey of the Bureau of Commerce on that date showed a reserve capacity of 150,000 bags in licensed sugar warehouses in the port.

AIR SERVICES AT THE PORT OF NEW YORK.

In the most recently developed field of transportation, air service, the Port of New York is rapidly attaining a commanding position. During the last thirty days five transcontinental, air-rail, passenger services have been put into operation.

The commercial flying fields in the New York Metropolitan area are constantly increasing in number, size and equipment. There are at the present time about twenty fields in operation, without counting the Army and Navy landing fields. All of the regularly scheduled passenger, mail and express services are concentrated at three airports, but a number of others are available for such service. At practically all of the fields, training, taxi and sight-seeing flights are made. Five additional airports are under construction and will be available shortly.

Port of Southampton Topics.

FURTHER DREDGING OPERATIONS.

The huge scheme of dock extension which is at present in progress at Southampton, with its prospects of accommodation for the biggest ships afloat and contemplated, has brought prominently forward the question whether the projected new liners, with tonnages possibly between 60,000 and 75,000 tons, will be able to reach the new docks without delay caused by the depth of the water. At present they could not, but the Southampton Harbour Board, with a keen eye to the future, has decided to proceed with considerable dredging operations. The Board is responsible for the deep water channel, and dredging has now been sanctioned between the Hook Buoy and Calshot Light Float with a view to widening the channel from 600-ft. to 1,000-ft., and giving it a depth of 35-ft. 6-in. L.W.O.S.T. The chairman of the Works and Harbour Committee (Alderman S. G. Kimber, J.P.) has hinted that further steps will be taken by the Board, so that the remarkable progress of the port shall in no way be retarded. The Board are going to give consideration to the deepening of the entire channel to 40-ft. and widening it to 1,000-ft., and though there are many difficulties in a work of this magnitude, there is no doubt that unless the channel is dredged to the same depth throughout more or less simultaneously, the advantage to shipping will be minimised. Unless the depth of water throughout the channel is sufficient to enable the big vessels to come to the docks at low water, such as the scheme in its entirety will make possible, the assistance to the big ships will not be so great as is desirable.

INCREASE IN TRAFFIC FIGURES FOR JULY.

Southampton Dock statistics for July, which have just been published, show, with one small exception, a substantial all-round increase in the traffic, which will clear off the arrears apparent earlier in the year. The number of vessels inward increased from 349 to 379, while outward the total rose from 345 to 386. These increases were reflected in gratifying manner upon the gross and net tonnage totals, which in three out of four instances increased by over 100,000.

The gross tonnage inward during the month amounted to 1,743,849, as compared with 1,591,812 in the corresponding period of 1928. Outwards, the aggregates were 1,696,021 as against 1,480,459. The net tonnage totals were unusually gratifying, for inward the total jumped from 824,984 in July of last year to 904,819 this year. Outward, the advantage of July, 1929, over July, 1928, was 112,181, the respective totals being 874,670 and 762,489.

The aggregate increase in the amount of cargo handled during the month amounted to over 5,000 tons, for although there was a slight decrease outward the inward figures were considerably greater. The inward total was 61,432 tons against 55,608. Outward, the total dropped from 47,083 in July, 1928, to 46,560.

The passenger figures went up considerably, an indication that more and more passengers are using the ships coming to this port. The number of inward passengers rose from 33,700 in July last year to 38,364 this year, while the outward total mounted from 41,005 to 43,820 for the same periods. There were thus nearly 8,000 more passengers using the port than in the corresponding month of last year.

ANNUAL REPORT FOR 1928.

The annual report for 1928 of the Southampton Port Sanitary Authority shows that during the year Southampton was the point of disembarkation for 86,332 passengers and the embarkation point was 142,542. The inward total was in excess of that recorded the previous year, but the outward total was slightly lower. The totals show that Southampton maintains its position as the premier passenger port of the United Kingdom. During the year 15,539 vessels entered the port, according to the report, representing a total tonnage of 10,975,616, and, in addition, 347 vessels arrived in Southampton Water and Cowes Roads to disembark passengers. The table of traffic to and from the Continent, including Mediterranean and Channel Island Ports, shows that there was an increase both inward and outward at Southampton. The number of cases of infectious disease reported to the Authority during the year was 1,356. No plague infested rats were found in any of the vessels coming to the docks.

" MAURETANIA'S " WELCOME.

Southampton's pride in the Cunard liner " Mauretania " in her recent record-breaking voyage across the Atlantic was shown when the " old lady of the Atlantic," as she is affectionately known, reached her home port on the completion of her voyage on August 21st. The " Mauretania " has been record-breaking even since her entry into the Atlantic trade, but her last voyage was the most glorious in her long and praiseworthy career. She startled the shipping world by steaming from Plymouth to Cherbourg in 3 hours 38 minutes, at an average speed of 29.78 knots. It was a sensational wind-up to a voyage of records, for her speed was greater during this burst than that attained by any merchantman previously. At times she touched 32 knots. Although she did not beat the " Bremen's " figures across the Atlantic, the " Mauretania," in view of her age, put up an exhibition which is a credit to British seamanship.

HUGE CROWDS TO VIEW LINERS.

With the entry of September, the shipping companies are getting to the peak of the home traffic of the tens of thousands of Americans, Canadians and other visitors who have been spending the summer in Europe. The movement westward, past experience teaches, begins in mid-August and continues throughout September, the beginning of the month being the greatest rush period. The big shipping companies have been marshalling all possible vessels into their North Atlantic fleets to cope with the traffic.

August has also been notable at Southampton for the large number of people it has brought to the port to inspect the great liners. Frequently as many as 10,000 people have visited one of the liners on inspection day, and during the month it is estimated that 80,000 excursionists have seen the marvels of the ocean giants.

IMPROVEMENTS TO " EMPRESS OF CANADA."

The Canadian Pacific liner " Empress of Canada," the holder of the Blue Riband of the Pacific, called at Southampton before proceeding to Quebec after being reconditioned and re-engined on the Clyde, and her spic and span appearance was much admired. After reaching Quebec the " Empress of Canada " will proceed to New York and Vancouver, where she will changs crews with the " Empress of France," which has been taking her place on the Pacific service while the re-engining process has been going on.

Apart from the installation of single reduction turbines in place of double reduction turbines, extensive alterations and modifications have been made in the vessel's public rooms, with the result that the liner is a worthy partner for the new " Empress of Japan," which is now building for the Pacific service.

" The Empress of Canada " was re-engined with a view to increasing her speed to 21 knots, but, on trials, run on August 7th and 8th, she averaged 22.4 knots. On the voyage from the Clyde to Southampton she averaged 21 knots.

The " Empress of Britain," the Canadian Pacific liner which is under construction at Clydebank, will enter the Atlantic service at the opening of the St. Lawrence season in 1931. She will represent a definite advance on any vessel hitherto constructed for the St. Lawrence route, for, in addition to being of some 40,000 tons displacement, she will have a length of 750-ft., beam of 97-ft. 6-in., and a speed of 25 knots.

Notes of the Month.

CAERNARVON HARBOUR TRUST.

The annual statement of accounts of the Caernarvon Trust shows that the receipts amounted to £2,713, and there is a balance of £602 on the year's working. The repairs to the sea wall, rendered necessary by the damage wrought by the storm twenty months ago, cost the Trust £2,475, which it is proposed to wipe out in five years. The assets of the Trust have been valued at £25,895.

NEW LONDON SERVICE.

For the assistance of London architects, consulting engineers and others, the Horseley Bridge and Engineering Co., Ltd., and their associated companies—Thomas Piggott and Co., Ltd., Guest, Keen and Piggotts, Ltd.—have opened a drawing office at No. 5, Victoria Street, Westminster.

Here, a technical staff is employed in designing and estimating for all classes of structural steel and bridge work.

This office is being run in connection with the chief London office of these companies, at No. 11, Victoria Street, and the manager will be pleased to receive any enquiries.

EXTENSION TO THE PORT OF CONCEPCION DEL URUGUAY.

The Commercial Secretary's office at Buenos Aires reports that the Executive Power has issued a decree through the Ministry of Public Works authorising the Department of Navigation and Ports to commence immediately the improvements and additions proposed for the Port of Concepcion del Uruguay, within the sum of $300,000 provided for in this year's Budget. The Department in question is to include in its Budget for the years 1930 and 1931 the sum required in order that the works may be finished during the year 1931.

The works to be carried out at the port of Concepcion del Uruguay have been approved, and are estimated to cost $3,970,800 (paper).

CONSTRUCTION OF SHEDS IN THE PORT OF HAMBURG.

Shed 83 in the Oderhafen, the construction of which was started a year ago, is now nearing completion and will probably be ready for use at the beginning of September. The technical equipment of this shed consists of 21 movable electric cranes on the water side with tracks for railway traffic to and from the ships. For the cart and lorry traffic a broad space is reserved, so that there will be no danger of stoppages. On the land side there are three railway tracks which make it possible to load at the same time three wagons standing alongside each other. A covered and broad ramp protects the goods against becoming wet during rain. The new shed is among the largest in Hamburg. It is equipped with sixteen mechanical scales capable of weighing goods up to 1,000 kg.

The completion of these sheds will mean a material increase of the shed accommodation of the Port of Hamburg. One more shed, No. 82, is being erected alongside No. 83.

BOMBAY PORT TRUST.

At a meeting of the Trustees of the Port of Bombay, held on July 16th, the following main items of business were disposed of:—

Estimates of expenditure for the following works were sanctioned:—

(1) Rs.1.98 lakhs for maintenance renewals of rails and sleepers on the Bombay Port Trust Railway during 1929-30.

(2) Rs.25,661 for construction of an additional railway siding and platform at Ballard Pier Station necessitated by the increased traffic in the busy season.

A lease for ten years was granted to Mr. Hasambhoy Jetha of a plot of land (area 388 sq. yards.) at Reay Road, opposite Dockyard Railway Station, for erecting shops with offices and residences above. Two renewals of leases on the Elphinstone and Mody Bay Estates were also granted on terms mutually agreed.

In view of the increase in the pilotage and transporting work the Board sanctioned the creation of one additional appointment of pilot, increasing the cadre to two master pilots and fifteen running pilots.

Mr. R. Walker, acting dock master, was appointed to act as harbour master in the vacancy caused by Mr. W. S. Hoseason proceeding on leave from 18th July, 1929, preparatory to retirement.

The Bombay Port Trust Employees' Union (representing the workshops' employees) having been registered under the Indian Trade Unions Act, it was decided to accede to their request for official recognition subject to restriction of membership to the classes represented by this Union.

WAGES DISPUTE IN ELBE INLAND SHIPPING TRAFFIC.

The arbitrator has raised the wage from Rm.44 per week to Rm.44.50, that is to say, a rise of 6 per cent. against the men's demand of 10 per cent. The new rate comes into force on October 1st, and will continue until December 31st, 1930. From January 1st, 1931, till June 30th, 1931, there will be a further rise of 50 pfennigs.

TRAWLER COMPANY'S DIVIDEND OF 12 PER CENT.

The Board of the Deutsche Hochseefischerei Bremen-Cuxhaven A.G. has decided to propose at the general meeting on September 14th that the company shall again pay a dividend of 12 per cent. on the year ended June 30th, 1929, i.e., on the increased capital.

HAMBURG: KIEL HARBOUR IMPROVEMENTS.

According to Press reports the negotiations between the town of Kiel and the Prussian Ministry of Finance for assistance in the development of the inner harbour at Kiel have resulted in an arrangement according to which the Ministry will contribute Rm.1,000,000.

NEW FLOATING GRAIN ELEVATOR FOR ANTWERP.

Messrs. Verschure & Co., of Amsterdam, who specialise in the building of pneumatic grain-handling plant, delivered a floating grain elevator to the port of Antwerp last month. The official trials of this elevator were highly satisfactory, especially with regard to fuel consumption, which proved to be below the guaranteed figure and for which a premium to the builders was granted. The tests showed a coal consumption of 1.59-lb. for every ton of grain discharged, and Messrs. Verschure state that as far as they know this comprises a record. The capacity of this elevator is about 300 tons of heavy grain per hour.

A Pneumatic Grain Elevator built by Messrs. Verschure & Co.

COLD STORAGE TERMINALS AT HALIFAX, NOVA SCOTIA: IMPROVED FACILITIES FOR THE FISH TRADE.

The official opening of the new fish terminal warehouse recently constructed by the Nova Scotia Cold Storage Terminals, Ltd., at Halifax, N.S., has now taken place. The warehouse is situated in the heart of the Canadian National Railways Terminal site, having 800-ft. of wharfage suitable for docking both ocean and fishing vessels, and is thus in an ideal situation for both import and export business. The management will control and operate with a single centralised power plant three distinct units comprising general cold storage, apple and potato storage, and the processing and freezing of fresh fish.

This diversification of cold storage facilities, it is pointed out, will enable the plant to be operated on an economical basis, resulting in substantial benefits to shippers, consumers and investors.

The cost of the new cold storage warehouse is expected to be slightly under $2,500,000, of which total $700,000 would be refunded by the Dominion Government under the authority of the Dominion Cold Storage Act of 1927, which provides for financial aid to the amount of 30 per cent. of the expenditure.

Shipping, Engineering and Machinery Exhibition.

Details of Exhibits to be seen at Olympia, London, from September 12th to 28th.

THE CAPE ASBESTOS CO., LTD., of Morley House, 26-30, Holborn Viaduct, London, E.C.1, will exhibit a complete range of their asbestos products, including blue asbestos mattresses for boilers, turbines, flanges and valves; Amosite asbestos mattresses; "Bluejacket" removable sectional covering and rope for lagging steam pipes; "Bluejacket" blocks for boilers; and blue asbestos composition; "Capyt," "Plutite," and "Rhodite" jointings; millboard sheets, tubes and joints; blue and white yarns, plaited yarn and proofed packings, and tapes; blue and white cloths for mattresses, theatre curtains, filtering and electrolytic work, blue and white crudes and fibres, and Amosite crudes and fibres, ropes and cloths.

There will be exhibited model boilers lagged with asbestos mattresses.

MESSRS. R. A. LISTER AND CO., LTD., of Dursley, Gloucestershire, will exhibit models of their extended road trucks, which make an ideal solution to the majority of transport problems, particularly where loads are bulky rather than heavy.

This firm will also show the mechanical sweeper and sprinkler auto-truck, which is a new cleansing system of reducing time and money. These trucks virtually supersede hand labour for sprinkling and brushing and are indispensable for the quick and thorough cleaning of large areas such as docks, wharves, etc., which are always in need of brushing and sprinkling.

These auto-trucks are quite easily manoeuvred, as they are of the most up-to-date design and manufacture.

SIR W. G. ARMSTRONG WHITWORTH AND CO., LTD., will have on their Stand models of various interesting types of mercantile vessels. As more than 1,000 vessels aggregating three million tons of shipping have been launched from the Armstrong Whitworth shipyards, this Company's exhibit will naturally give prominence to this important side of their activities.

A working mdoel of the B.A.W. automatic train coupler will also be shown.

MESSRS. THORN AND HODDLE, LTD., of 151, Victoria Street, Westminster, S.W.1, will have a comprehensive exhibit devoted to oxy-acetylene welding and cutting, also acetylene portable lamps, and flares of all kinds.

Their latest introduction is a new patent diaphragm type pressure regulator for oxygen or acetylene.

Actual operations of welding will be shown on the Stand.

MESSRS. BABCOCK AND WILCOX, LTD., are showing a number of full-size sectional details of their water tube boilers and furnace equipment as supplied for both marine and land purposes. The sizes of modern steam generating units naturally preclude anything in the nature of a complete exhibit, but a typical modern Babcock steam raising unit, as supplied to the super electric power stations and other large steam raising installations, is shown in the form of an illuminated sign model which indicates very clearly the actual furnace, water circulation, steam generation and draught conditions in full operation.

There is also an example of a Babcock oil fuel pump and heating unit as used in conjunction with oil firing installations.

Another notable exhibit will be the Babcock feed water regulator, for which the principal merits claimed are: simplicity, certainty of action, absence of friction in its working parts, and freedom from the possibility of derangement.

A range of numerous steam valves now manufactured by this firm will also be on view.

MESSRS. LAURENCE, SCOTT AND ELECTROMOTORS, LTD., of Norwich, will show examples of their electrical machinery, in which they have specialised for more than thirty years. These include the "Scott" worm-geared electric winches of several sizes, electrical equipment for capstans and windlasses, a standard ship's generator, and, in a prominent position of the Stand, will be shown the "Donkin-Scott" all-electric stearing gear, which has been fitted to a large number of vessels.

MESSRS. A. G. MUMFORD, Ltd., of Colchester, will exhibit the "Vertex" electrically-driven Duplex reciprocating pump, which is of new design and has been specially designed to minimise floor space and reduce weight, as compared with pumps driven through spur gearing.

Another pump is the "Centricone," which has no working parts except an impeller and bearings and is arranged to be directly coupled to a motor.

Other exhibits are the horizontal oil fuel pressure pump and the hand oil fuel pump.

MESSRS. CROSSLEY BROS., LTD., Openshaw, Manchester. This exhibit will comprise two examples of modern heavy oil engines—one a new vertical type, and the other a horizontal enclosed type. It is claimed that both engines are specially suitable for marine purposes. The principal exhibit is described as a five-cylinder vertical compressorless Diesel engine, and is shown in working operation and direct-coupled to a Metropolitan-Vickers 90-kw. 220-volt, compound wound electric generator, the whole being mounted upon a substantial under-baseplate. This combined unit operates at 450 r.p.m., and, as a marine auxiliary, is suitable for electric lighting or to supply current to operate motors for winches, pumps, etc.

MESSRS. DELCO-REMY AND HYATT, Ltd., 111, Grosvenor Road, London, S.W.1, will have on view an example of the Hyatt roller bearings, which are used very extensively in conveyors and all material-handling equipment.

Plummer blocks, drop hangers and other lineshaft equipment incorporating Hyatt shafting boxes will also be on view.

THE EDISON SWAN ELECTRIC CO., LTD., will be exhibiting the well-known Royal Ediswan lamps, Edison Swan cables, stationary type batteries and the new Ediswan house wiring systems.

THE LONDON, MIDLAND AND SCOTTISH RAILWAY CO. This Stand will be more in the nature of an enquiry office where information regarding travel on the L.M.S. Railway may be obtained.

This Company will show a model of one of their latest steamers or locomotives.

MESSRS. ALFRED GRAHAM AND CO., LTD., St. Andrew's Works, Slough. In the brief history of the loud-speaking telephone sufficient has been written to show it is essentially of British origin and that the first instruments to be successfully applied, both technically and commercially, were those manufactured under the patents held by this firm.

On their Stand is exhibited the Standard Graham improved pattern watertight Navy'phone, which works on a direct four-wire circuit and is designed to be fixed on bulkheads or carried on pillars.

Other exhibits on this Stand are: a two-wire telephone system, the "din-proof" 'phone, which is designed specially for use in noisy places, such as engine rooms, etc., the Graham "Multiphone" and the "Cabin'phone."

Messrs. Alfred Graham and Co. will also have on view hand combination telephone sets, fire control 'phones with headgear, and samples of their bells, gongs and fire keys.

MESSRS. BRITISH ROPES, LTD., will exhibit samples of their steel wire rope of every description for mining, shipping, fishing, oil well drilling and production, cranes and general engineering purposes, elevators, aeroplanes, bridges, timber hauling, yacht rigging, salvage purposes, scaffold lashings, steam ploughing and dredging.

MESSRS. S. WOLF AND CO., LTD. This firm's exhibits will cover three classes of machinery, viz.:—

1.—"Wolf" portable electric tools.
2.—"Schuler" sheet metal machinery.
3.—"Boley" machine tools.

The "Wolf" electric tools should be of interest to readers of our Journal, in view of the work which is continually being carried out on the maintenance of docks and harbours.

THE SUNDERLAND FORGE AND ENGINEERING CO., LTD. This exhibit will include the following machines, etc.:—

One electrically driven worm-geared silent deck cargo winch.

One contactor type control gear panel for use with the above winch and suitable for mounting in a deck-house.

Two 100 kw. 220-volt open type single pedestal bearing generators suitable for direct coupling to Diesel or steam engines.

One standard 10 kw. 110-volt ship lighting set with open type steam engine.

One 15 kw. 110-volt ship lighting set, with enclosed type steam engine.

One Sunderland Forge six-way marine type switchboard.

One 26-ft. patent Unistart system switchboard, also electrically driven pumps and fans wired to the switchboard to demonstrate the working of this system which eliminated the fitting of starters for each individual motor.

One Sunderland vibratory screen, in operation, suitable for grading coal, coke, cement, etc., also rock and coal drilling equipment.

MESSRS. RUSTON AND HORNSBY, LTD., Lincoln, will exhibit Ruston 200 kw. marine-auxiliary generating set, as supplied for vessels of several prominent shipowners.

The engine is a five-cylinder unit running on the Ruston airless injection principle. It is claimed that the engine is a reliable power unit, capable of running continuously over long periods with heavy loads when using low-grade fuel oils.

A feature of the engine is the manufacturer's patent fuel distributor, which ensures a uniform distribution of the load between the cylinders. Adequate lubrication of all the working parts is secured by means of forced lubrication with an efficient lubricating oil filtering system.

Great attention is paid to selection of high-grade materials, and this, with care in manufacture and efficient lubrication, makes for a thoroughly reliable unit.

EDWARD BENNIS AND CO. LTD., 28, Victoria Street, London, S.W. The working exhibits on this Stand will comprise:—

1. A natural draught coking stoker on a single flue Davey Paxman economic boiler.
2. A new type air draught stoker applied to a two-flued marine boiler.
3. A forced draught chain grate of the new carrier bar type with multiple air control.
4. A coal pulverising plant on the Simplex unit system.

THE CABLE MAKERS' ASSOCIATION will exhibit various types of their rubber insulated cables, including lead-covered armoured cables and certain types of flexible cords.

Other types will be flexible cables, ship wiring cables, main cables, telephone cables and under-water power cables.

THE ALLOY WELDING PROCESSES, LTD., Walthamstow, London, E.17. This firm propose to show their comprehensive range of electric arc welding equipment, and will have on view ten different types, including their latest design of motor generator set, which should appeal to those who desire a machine of pleasing appearance, light weight and small dimensions. Demonstrations will be given daily in the use of electrodes.

THE MARCONI INTERNATIONAL MARINE COMMUNICATION CO., LTD., Marconi House, Strand, London, are exhibiting a comprehensive range of wireless and non-wireless apparatus. Replicas of wireless cabins on large and small ships will be erected on their Stand, and other apparatus is so arranged that the space necessary for the installation on board ship may readily be estimated.

Demonstrations will be given of the Marconi Auto Alarm, which has been approved by the British Government for use on board ships which do not maintain a continuous wireless operator watch. We understand that more than 1,000 sets of this apparatus have now been installed on British ships.

A section of the Stand is devoted to the Marconi marine electrical equipments. Here will be shown the Marconi depth sounding devices, which are based on the well-known Langevin-Florisson Supersonic system, to which certain modifications have been applied; in particular, a very interesting new indicator which shows directly and visibly the depth of water, the pointer remaining stationary for a definite period at the depth last obtained.

The Marconi Band Repeater, Marconi Music Player, and automatic

inter-communication telephone apparatus will also be shown.

MR. H. C. SLINGSBY, the first international truck builder, will exhibit a selection of trucks, ladders, barrows, etc.

METROPOLITAN-VICKERS ELECTRICAL CO., LTD., of Manchester. On this Stand will be shown a 7½-kw. ship's lighting set, a 5-h.p. T.E. vertical pump motor, a 10-h.p. ditto, a generator switchboard, a condensate extraction pump, 11-h.p. totally enclosed ventilated motor, etc., as well as a complete range of cabin fans with various finishes. Marine wiring accessories, including the Met.-Vick. special lampholder in brass or bakelite, ceiling plates, switches and adaptors. State-room, saloon and cabin fittings, including the latest development of the new "Gilbert-Riley" glassware, chromium plated bulkhead heaters, fires and cooking apparatus of various types, a combined blower and vacuum cleaner of compact design, and, in the wireless section, band repeater, broadcast and gramophone reproducers and amplifying apparatus.

BELDAM ASBESTOS CO., LTD., of Hounslow, Middlesex. This firm's exhibit will comprise a varied assortment of their productions in packings for steam, water, refrigerator and oil machinery, and include exhibits of their patent packings, viz.:—

Lascar V. Duplex for H.P. steam; auto lip for pumps and hydraulics; Beldamok for superheated steam; Benzoil for oil glands; and their world famous Kymbala jointing.

Also will be shown a variety of asbestos, hemp, flax and cotton manufactures, laggings for boilers and pipes, as well as various models of the Auto-Klean strainer, which is now being so extensively used for marine and industrial purposes.

MONEL-WEIR, LTD., of Glasgow. On this Stand the greater part is a wonderful display of Monel metal, which reveals it to be of really universal service. This natural alloy is being recognised as the best all-round non-ferrous alloy for a wide variety of purposes. Some idea of the general use of Monel metal in marine engineering work is afforded by the extensive adoption of this material in the high-pressure Parsons turbines of the "Beaver" class ships of the Canadian Pacific Steamships, Ltd., in which the blades of the first three stages are of Monel metal.

DAVEY PAXMAN AND CO., LTD., of Aldwych House, Aldwych, London, will exhibit one of their four-cylinder vertical cold starting oil engines, specially designed for marine auxiliary work and capable of developing 250-h.p. continuously with overloads of an hour's duration up to 290-h.p.

The engine is totally enclosed and provided with forced lubrication throughout. The speed of the engine can be varied whilst running, either by the governor or by means of an independent hand control. It will be shown running on its own power and will be stopped and started to demonstrate the simplicity of this operation.

Also on view will be No. "0" size, 3-section Paxman patent all-steel section boiler, which is manufactured of mild steel plates, which avoids the risk of fracture. This boiler is built up on the multiple unit system; each section is self-contained, there being no water joints to make (or leak) between them.

These are made in three types, namely, for central heating by means of hot water; central heating by means of low pressure steam; and hot water supply for domestic and other purposes.

ANTIFYRE (SALES), LTD., 11, Golden Square, London, W., are exhibiting their fire extinguishers, including the "Antifyre" Pistole Extinguisher, which is used by many of the leading shipping companies, engineering firms, and boat owners. It is claimed that this extinguisher will put out in one second a 20-ft. fire of petrol or other highly dangerous substance.

Other exhibits include the latest type of foam extinguisher and soda acid machines named respectively: the "Antifyre" Foam King, and the "Antifyre" Alert Extinguisher.

RUBBER GROWERS' ASSOCIATION, of 2-4, Idol Lane, Eastcheap, London, are staging a comprehensive exhibit demonstrating the most recent applications of rubber in the engineering and shipbuilding industries. Two of the main attractions will be a motor launch and a large model of a railway coach, in both of which the latest practice in rubber equipment will be displayed. In the launch, particular reference may be made to the rubber flooring and mats, sponge rubber and pneumatic upholstery, propeller shaft bearings, ships' fenders, life-saving devices, and protective rubber clothing.

The railway coach is divided into various compartments, including sleeping berth, saloon, kitchen and lavatory. This arrangement allows for the effective demonstration of rubber articles now used in railway work, e.g., rubber upholstery, rubber flooring, rubber insulated refrigerators, rubber lined sinks, rubber springs, brake accessories, etc.

With a view to emphasising the value and utility of rubber flooring in ships, all the designs shown on this portion of the raised Stand are similar to those laid in well-known vessels.

THE SPERRY GYROSCOPE CO., LTD., 15, Victoria Street, London. The Sperry display will, as at previous exhibitions, be of general interest, including, as it will, a working example of the modern method of ship navigation, comprising a Sperry Gyro Compass of the type generally supplied to the Mercantile Marine, complete with bearing and steering repeaters, automatic course recorder, Sperry-Villiers odograph, and a gyro repeater incorporated with a Marconi direction finder.

The Mk. V. gyro compass, better known as the Admiralty standard, will also be on view, as well as the Sperry searchlights and a nautical log of the S.A.L.

REAVELL AND CO., LTD., of Ipswich. The chief feature on this Stand will be a range of deck auxiliaries driven by compressed air for tugs, coastal vessels, yachts, etc. These will comprise winch, windlass, capstan and steering gear. In the centre of the Stand the office will be made in the form of a chart-house and bridge.

There will also be shown C.S.A. and H.C.S.A. type charging compressors for Diesel engines, which are suitable for pressures of 450 and 1,000-lb. respectively. Another important exhibit will be a vertical, three-stage marine type compressor with a capacity of 300 cu. ft. of free air per minute, and a pressure of 1,000-lb. per square inch. Messrs. Reavell and Co. will also show a number of rotary air motors.

LACY-HULBERT AND CO., LTD., of Croydon, will have on view a number of portable compressors which will be of particular interest to our readers for paint spraying, riveting, cleaning, and a variety of other purposes connected with dock and ship repairs.

DONKIN AND CO., LTD., of Newcastle-on-Tyne, will show the "Donkin-Scott" electric steering gear with electric control, suitable for all types of Diesel engine vessels.

THE CONSOLIDATED PNEUMATIC TOOL CO., LTD., of Egyptian House, 170, Piccadilly, London, will be showing a large and interesting range of portable pneumatic and electric labour-aiding machines, including the Boyer and Boyer superior pneumatic hammers for dealing with all classes of rivetting, chipping, caulking, tube beading, tube cutting, and for scaling boilers, ships' bottoms, old paint work, etc. These will be shown in operation together with the Little Giant, Red Giant and New Giant, pneumatic drills, air compressors (stationary and portable), a complete range of portable electric tools, duff jacks, vacuum pumps and condensers.

E. GREEN AND SON, LTD., of Wakefield, will exhibit their Economisers suitable for all types of boilers and all pressures for:—

(a) Reducing the fuel consumption of steam boilers 15—20 per cent.;

(b) Increasing the steaming capacity of the boilers; and

(c) Raising the overall efficiency of the plant.

There will also be shown:—

(1) Green's standard vertical tube economiser with automatic scrapers.

(2) Green's patent tri-tube economiser installed in power stations all over the world.

(3) Green's H.V. economiser, single-tube type, capable of withstanding the highest boiler pressures; and

(4) The Foster economiser installed in the largest industrial high-pressure steam-raising plant in Europe.

HADFIELDS, LTD., of Sheffield, intend to make the main feature of their exhibit the demonstration of special steels for high temperature engineering, which are shown in a manifold variety. This firm claims that the "Era" heat-resisting steels are making rapid progress in all branches of industrial practice, and that there is an increasing demand for them for all classes of furnace uses, conveyors, retorts, muffles, case-hardening boxes, air-heating tubes, and appliances for a multiplicity of heating operations.

The exhibits include examples of general castings and forgings, notably a marine crankshaft and castings of "Era" manganese steel for dredger components and wearing parts.

JAMES WALKER AND CO., LTD., of Woking, Surrey. This firm's Stand will show specimens of their well-known products, including "Lion" packings, which were introduced nearly 40 years ago at a time when the really efficient packing was needed. "The King of Packings" is one that depends upon the working pressure for tightness and not upon the pressure exerted upon it by screwing down.

A most important type of packing is the "Lion" automatic hydraulic type, which is moulded with a lip on the working face. This lip is expanded by the working pressure, thus embodying the well-known principles of the ram leather. The face of the packing is studded with white metal studs, so placed that, in actual working pressure, a continuous bearing face to the rod is maintained.

Jointing also plays a very important role in the general working efficiency of modern power, and Messrs. James Walker have for many years specialised in jointing production for all purposes and pressures.

For those of our readers who are not able to attend the exhibition, Messrs. James Walker will be pleased to post one of their instructive illustrated booklets.

PREMIER ELECTRIC WELDING CO., Abbey Wood, London, S.E. A large number of mechanical and semi-mechanical welding devices for producing rapid and sound welding by means of coated electrodes operated by special machines will be the feature of the Premier Electric Welding Co.'s display. The range of exhibits includes the "Flexin" hand welding and the "Flexin" flexible electro.

The "Belfinish" electrode, which is said to have introduced a new era in welding as applied to engineering, will be demonstrated by members of the Company's technical staff, and the remarkable results obtained will be illustrated by welded samples of various types.

Not only the "Belfinish" electrode, but the full range of "Premier" electrodes will be on view.

Examples of Prescott resistance welding machines manufactured by the British Insulated Cable Company will also be shown at work, welding all classes of steel and iron and some non-ferrous metals.

Visitors to this Stand will also be able to see examples of the Premier drooping characteristic and multiple operator welding plants.

RADIO INTELLIGENCE LTD., of Marconi House, Strand, London, will be exhibiting their latest types of marine radio apparatus for all classes of ships. A ship's cabin containing a complete 1½ kw. radio transmitter and receiver will convey an accurate impression of the appearance and space required for efficient operation. The valve transmitter is of the most recent design for continuous and interrupted continuous waves, and conforms to all national and international regulations governing marine wireless installations. The Auto alarm for use on ships which do not keep a continuous wireless watch, will be on view and will be demonstrated.

CAMBRIDGE INSTRUMENT CO., LTD., of London and Cambridge. This firm will exhibit a representative collection of instruments for ships and engineering works, including electrical CO_2 and CO indicators and recorders. Apparatus for recording the percentage of dissolved oxygen in boiler feed water, draught, and pressure gauges, temperature measuring instruments, automatic temperature regulators and other instruments for engineering and electrical measurements.

A feature of the exhibit will be a complete installation of six illuminated dial CO_2 indicators, which will be shown in actual operation, working in conjunction with CO_2 recorder.

NEGRETTI AND ZAMBRA, of 38, Holborn Viaduct, London, E.C. Their exhibits will include a collection of dial type indicating and recording instruments for temperature, pressure and draught for marine use, comprising dial thermometers, mercury-in-steel type, for Diesel exhaust temperatures, recording thermometers, mercury-in-steel distance type, for funnel temperatures, with compensated capillary tubing, enabling the recorder to be placed in the stoke-hold. Recording thermometers for ships' refrigerated chambers, mercury-in-steel distance type, with compensated capillary tubing enabling the recorder to be placed in the refrigerated machinery space. Dial thermometers, mercury-in-steel distance type, for steam temperatures. Electrical distance thermometers, with multi-point indicator, totally enclosed in cast-iron marine type case. Thermo-electric pyrometers, totally enclosed, marine type, for furnace temperatures up to 3,000 deg. Fahr. Dial type tank gauges for showing the volume of oil in fuel oil tanks, with dial indicator in place of mercury column. Dial type draught gauges with open readings for accurate measurement of forced, induced and natural draught. Photographic temperature recorder for cold chambers, etc.

THE LEA RECORDER CO., LTD., of Manchester, will exhibit the following apparatus for the measurement of fluids and solids:—

1.—Lea Recorders.

(a) V-notch recorders for boiler feed water, condensates, and the like.

(b) Recorders for civil engineering purposes, including new types of compound recorders and integrators for measuring widely fluctuating flows in streams, rivers, etc., over stepped or compound weirs, thus giving dry weather and storm flow records in one machine, and with equal accuracy.

Water level or tide indicators will also be shown, together with electrical apparatus for transmitting readings to a central office, or wherever desired. This apparatus consists of a transmitter situated in the immediate vicinity of the reservoir or tank, etc., and a receiver in the distant office or other convenient place.

The transmitter is actuated by a float, by the rise and fall of which electrical contacts are made and a current transmitted to the receiver. The transmitter may be fitted with indicating hands, and a dial to indicate, by purely mechanical means, the level of the liquid; thus it may serve as an indicator by which the receiver can be set or checked at any time.

The receiver is operated by electrical impulses from the transmitter, and indications of the level are shown on a graduated dial. If required, a clock driven chart drum and pen mechanism may be fitted to record the variations in level, the maximum pen movement being made to suit individual requirements. An alarm can also be fitted to the receiver to ring at any predetermined level.

2.—Coal meters for measuring the amount of coal consumed on chain grate or other mechanical stokers.

3.—"Cubi-Meters" for measuring coal and other materials in bulk in connection with coal handling, or conveying plants or for measuring coal to pulverisers. These machines are now in use for measuring grain, etc.

MESSRS. HENRY HUGHES AND SON, LTD., 59, Fenchurch Street, E.C.3, will have a special exhibit of modern navigational outfit for ships, viz.: the British Admiralty echo sounder. Other exhibits on view will be the Husun patent dead-beat compass, the Husun micrometer sextants, ships' clocks, marine binoculars, sextant telescopes, aneroid barometers, Husun sounding machines, etc.

The Holmes magnetic master compass and path indicator is of special design adapted to operate any required number of repeaters at distant stations. The path indicator is an entirely new type of instrument which has been designed to show how far the ship has deviated from the course laid down by the navigator; it is mounted in combination with a vertical card repeater and enables the quartermaster at the helm to keep the ship to the actual track laid down on the chart.

Hitherto it has only been possible to bring a ship back to her course (direction) after a deviation from any course such as a yaw due to heavy seas; by means of this new instrument she can be brought back to the actual track laid down on the chart whether the deviation has been small, due to the effect of wind and sea, or larger, due to the necessities of manoeuvring in crowded seaways.

WAILES DOVE BITUMASTIC LTD., of Newcastle-on-Tyne. Corrosion is responsible for the rapid depreciation of plant and machinery; in the British Isles alone the loss through corrosive activity is estimated at £100,000,000 annually. How corrosion in its various forms can be effectively overcome—thus adding to the life and efficiency of iron and steel work—will be fully demonstrated by Wailes Dove Bitumastic, Ltd. (the pioneers of anti-corrosive preparations). Interesting practical exhibits, laboratory tests, technical data, and literature dealing with every known corrosion problem will be available, whilst skilled men will be in attendance to advise on any point. There are many different "Bitumastic" preparations, each one designed to do a certain job, and all covering every known form of corrosive activity. How these are applied and the way in which they can be adapted to individual and special requirements, will be willingly explained. Every branch of the shipping, engineering, machinery and building industries is catered for, and all visitors whose business is dependent upon the efficient service of iron, steel, concrete, etc., will find much information of practical value at Messrs. Wailes Dove's Stand.

W. H. DORMAN AND CO., LTD., of Stafford. On this Stand will be found several exhibits of interest to our readers. The principal section will consist of internal combustion petrol-paraffin engines for marine purposes. Three models will be on view, the largest being a six-cylinder model having an output of 150 b.h.p., whilst the other two will be four-cylinder units developing 40 b.h.p. and 28 b.h.p. respectively. Dorman engines cover a wide range of applications; for example, they are used in large numbers as the power units of welding plants, air compressor sets, pumping equipment, and the like.

SUPER-CENTRIFUGAL ENGINEERS, LTD., of 101, Grosvenor Road London, S.W., will show several types of the well-known Sharples super-centrifugal separators and clarifiers, which are finding a rapidly increasing application in a wide range of modern commercial manufacturing processes and in the marine world. Visitors to the exhibition may observe the performance of several types of Sharples' oil purifiers and separators in actual operation, under conditions as nearly as possible approaching those of an ordinary commercial installation. Sharples' expert engineers and chemists will be at hand to explain and demonstrate the operation of the latest machines to interested callers, and full technical information will be afforded relating to the application of super-centrifugal force in the purification and preparation of such commercial materials as Diesel engine fuel and lubricating oils, turbine lubricating oils, fats and greases, vegetable oils, mineral oils, varnishes, paints and enamels, tars and associated products, fish oils, etc.

Another exhibit which will undoubtedly create a great deal of interest is the Sharples bulk centrifuge. This machine has been produced to overcome the many difficulties encountered in the separation of liquids from solids, where the solid content of the mixture is relatively high. By its use, the solid material can be dehydrated to a very low moisture content.

SIEMENS BROS. AND CO., LTD., of Woolwich, London, S.E. On this Stand will be shown electric ships' telegraphs, telephones for navigational purposes, electric helm indicator, ahead and astern revolution indicator, navigation lights indicator, "Look-out" indicator, torsionmeters, two I.C.W. transmitting units, a short range telephone transmitter, a Siemens patent auto alarm device, a single rotating frame direction finder, electrical distance thermometers, thermo-electric pyrometers, optical pyrometer, etc., altogether making a very attractive Stand.

BLACKSTONE AND CO., LTD., of Stamford, will exhibit one 55 b.h.p. horizontal single-cylinder "Blackstone" heavy fuel-oil engine; one 64 b.h.p. horizontal two-cylinder heavy fuel-oil engine direct coupled to a 230-volt. "Bull" generator; one 1½ kilowatt "Blackstone" petrol electric set; one 3-in. "Blackstone" belt-driven cast iron "Unchokeable" pumping set; and one 3-in. "Blackstone" Unchokeable pump direct-coupled to a 5 b.h.p. "Blackstone" No-trouble petrol engine.

ALFA-LAVAL CO., LTD., of 34, Grosvenor Road, London, S.W. Among the exhibits on this Stand will be found centrifugal oil machines, both for marine use and for land purposes. These machines can be supplied to deal with two gallons per hour up to 1,200 gallons per hour, and can be driven either electrically or by belt from overhead shafting.

THE YOUNG ACCUMULATOR CO. (1929), LTD., London, will exhibit a range of Young accumulators covering every requirement in ship lighting, marine wireless, yacht lighting, and motor boat starting and lighting. These accumulators, which have never before been exhibited, are filled with a new and entirely satisfactory solid electrolyte known as Dri-Power, and, it is claimed, having given astounding results under prolonged impartial investigation and test. It is also claimed that Dri-Power overcomes all the trouble previously associated with solid electrolytes and will give much greater capacity compared with the ordinary type of lead-acid battery even at high rates of discharge.

Young accumulators filled with Dri-Power have been continuously overcharged, both at normal rates and at high rates over long, unbroken periods, without loss of capacity or of condition.

They are already in use by many prominent steamship lines and other companies engaged in all forms of transport.

GLENFIELD AND KENNEDY, LTD., of Kilmarnock. Among the exhibits will be the "Glenfield" drop tight tilting disc valve, which is a recent introduction and represents the complete solution to the problem of manufacturing a drop tight rotating disc valve. It constitutes a radical departure from all conventional types and possesses the unique feature of rotation through its own seat.

Since the introduction of this valve a short while ago, its unique advantages have been recognised by engineers, and large numbers have been supplied to the leading power stations, waterworks authorities, and pump manufacturers in this country and abroad.

Another exhibit is the 24-in. "Glenfield" electrically operated sluice valve, which represents the latest development in the design of such valves with distant indicating and control equipment. There are also on view "Glenfield" water meters, oil sluice valves, hygienic drinking fountain, which is designed for use in factories, shipyards, etc., two patterns of the non-concussive, self-closing taps, etc.

PETTERS, LTD., of Yeovil. On this Stand will be shown the well-known Petter marine oil engines, self-contained air compressor sets, generating sets, the Petter combination general service pump and starting air compressor set, a Petter automatic Diesel 50 b.h.p. marine engine, and the Petter sectional engine model, etc.

THE ELECTRIC SUBMERGED LOG CO., Port of London Building, Trinity Square, London, E.C.3, will exhibit their Nos. 1, 2 and 3 Type Logs. The No. 1 Type has a distance recorder registering every 15.2-ft. and a separate speed indicator, indicating every half-knot from 0 to 40 knots, together with distance recorder and speed indicator repeaters, and a Coursograph Relay, also a speedograph which gives a continuous record of the vessel's speed. The No. 2 Type has a distance recorder registering every 100th part of a mile; speed in this Type is obtained through the medium of a flash lamp and speed tables. The instrument is operated by an impeller 2¼-in. in diameter, which is situated in the lower end of a strong metal arm which extends well outside the ship's bottom, and is easily withdrawn inboard when required. The function of the impeller is to make contact between two small contact springs in the submerged mechanism through a worm gearing. Each time a contact is made an electric impulse is transmitted to the master instrument, where it energises the coils, and so operates the recording instruments. All these logs are guaranteed to record distance to ¼ per cent. and to indicate speed to half a knot under all conditions of weather or draught, and at any speed from 0 to 40 knots. They will outlast the life of a ship, and their upkeep costs are practically nil.

FUSION IN ELBE INLAND SHIPPING.

At the combined general meeting of the Neue Norddeutsche Flussdampfschiffahrts-Gesellschaft Hamburg and the Vereinigte Elbeschiffahrts Gesellschaft A.G. in Dresden, it was decided to amalgamate the two concerns under the name Neue Norddeutsche und Vereinigte Elbeschiffahrts A.G. with its head offices in Hamburg.

GERMAN HERRING FISHERY.

The present herring season is said to be very prolific. The Cuxhaven trawlers have made unusually large catches on short trips, and the quality of the fish is exceptionally good. On Saturday, the 17th August, there was at Cuxhaven a turnover of 1,452,000 pounds, and on the 19th the figure was 1,581,000 pounds. These two amounts include 2,782,000 fresh herrings.

ELECTRIC STEAM GENERATION PLANT IN ONTARIO.

The Canadian Hydro-Electric Corporation, Ltd., is about to erect at Hawkesbury, Ontario, a new transformer station costing approximately $200,000. The station will operate to a capacity exceeding 40,000 h.p., and will supply current to the big pulp mills of the Canadian International Paper Company at Hawkesbury. At these mills, boilers are being installed for the generation of steam by electricity. This installation is expected to be ready by next October. The generation of steam by using off-peak current will enable the Company to reduce its expenditure on coal, and the erection of the new sub-station at Hawkesbury will strengthen the distribution system of the Canadian Hydro-Electric Corporation, providing additional facilities for industries in that neighbourhood. The installation will consist of three 13,300 K.V.A. transformers.

Irish Harbour Matters.

CORK HARBOUR DEVELOPMENT PROPOSALS.

Mr. Taggard Aston, a prominent consulting engineer in the United States, has informed the Cork Harbour Commissioners that a group of American financiers is prepared to finance a scheme for the improvement and development of the Port of Cork, involving an outlay of one and a half million pounds sterling. This group, it is stated, is greatly impressed with the potentialities of Cork Harbour for development as a terminal port. The port already has the advantage of deep water and safe anchorage, and the only thing necessary for a development of trade would be the provision of facilities to cope with the increased traffic.

These points have been brought before the directors of the large European Trans-Atlantic shipping companies, in order to gain their co-operation; and on his return to Ireland, Mr. Aston has promised to outline his scheme to the Cork Harbour Board.

It is understood that, broadly, the scheme will be based on plans suggested eight years ago by Mr. George E. Nicholson, chief engineer of the Port of Seattle, Washington, U.S.A., after a detailed inspection of virtually all the ports in Ireland. Mr. Nicholson pointed out at the time the reputation of Cork Harbour as the largest protected harbour in Great Britain and Ireland. He agreed that it was one of the finest natural harbours in Europe, adding that, when proper terminal facilities were provided, it would furnish accommodation for the largest vessels afloat at all stages of the tide.

"Your harbour," stated Mr. Nicholson, "is not only a most capacious and secure harbour, sheltered against wind and sea, but located at a most strategic point; for, besides being at the southern extremity of Ireland, it is the first port of call for trans-Atlantic steamers, and is almost in the direct line of those vessels plying between America and Europe."

Certain recommendations for preliminary improvements to be carried out within five years were made. These included the extension of the entrance and main channel dredging, and the removal of a small western portion of the harbour rock, and the complete removal of the Tudor Bank. This work is regarded as most important, since there would be little use in providing modern facilities in the inner harbour if the entrance channels were left as at present. Mr. Nicholson suggests that no serious effect would result, even in a heavy gale, from the removal of the harbour rock which acts as a natural breakwater for Cobh (Queenstown).

By the proposed construction of a pier at Cuskinny, a short distance from Cobh (Queenstown), it is stated that a vessel could berth alongside a pier in this location, even in a gale, and without assistance from tugs, as only fifteen minutes are required to steam to Cuskinny after passing through the entrance channels. On this site, according to plan, provision has been made for a railway connection. There is ample space for a railway yard and also for industrial development. The provision of transit sheds and other accommodation would cost £942,500.

A sum of nearly a quarter of a million is allocated to the improvement of the Uppe River harbour, and these suggested improvements include the widening and deepening of both the north and south river channels, together with the replacement of certain wooden quays, the erection of transit sheds, the installation of double ship side tracks and more modern mechanical handling equipment.

The land reclamation scheme of the Harbour Commissioners at Tivoli, now proceeding, would benefit from this.

It is in the possibilities of this scheme that the American "combine" is most interested, and that they are prepared to finance under an arrangement with the Commissioners which would enable the Commissioners to take over the property at any time that their finances permit.

One member of the Harbour Board has expressed the view that the principal and interest of a loan for this work could be met out of the anticipated revenue after the completion of the work.

An important aspect of the work is that the purchase of private property at Cuskinny is not necessary. in the preliminary developments. Even the proposed piers can be built without interference with the property alongside the site, for their location is far out in the bay beyond the high water mark.

Mr. Nicholson pointed out at the time that this land is not under the control of the Board, and it would be necessary to purchase from the Government a small strip of land between high and low water mark.

The passenger and cargo business of the Antrim Iron Ore Co., Belfast, has been acquired by Coast Lines, Ltd., Liverpool. The deal involves the acquisition by the Coast Lines of the steamers "Glendun" (1,013 tons) and the "Glentaise" (1,001 tons), which have been engaged on the service between Belfast and the East Coast of Scotland and England for several years. The terms of the deal have not been disclosed. The present chairman of the Antrim Iron Ore Co. is Mr. Hugh O'Neill, M.P., and all directors reside in Belfast. Mr. Jas. Brabazon, J.P., is the general manager of the Company.

The Port of New Orleans.

SHIPPING IN JULY.

An all-round increase in the ocean trade of the port of New Orleans for the month of July, 1929, as compared with July of 1928, is shown by the records of the Dock Board. There were 290 arrivals in deep-sea trades, with aggregate gross tonnage of 1,142,350, which is a comparative increase of 39 vessels and 204,621 gross tons. The increase in outward movement of vessels was even greater—306 departures as compared with 241 for the previous July, a difference of 65 vessels. Gross tonnage of out-bound vessels is not recorded by the Board.

General merchandise handled over the public wharves in July amounted to 341,276 tons, or 28,370 tons more than in July, 1928. This is in addition to the movement at private landings and also does not include 12,324 tons of grain handled through the public grain elevator for export. The public banana conveyors handled 2,160,098 bunches of bananas, a comparative increase of 246,430 bunches.

The schedule of shipping arrived at New Orleans in July, 1929, by flags and tonnage, was as follows:—

Flag	Number	Gross Tons
American	159	721,583
British	18	68,824
Brazilian	2	12,312
Belgian	2	12,073
Colombian	1	2,054
Danish	8	21,093
Dutch	2	14,233
French	5	31,210
German	6	24,984
Honduran	31	77,874
Italian	4	23,548
Japanese	3	15,465
Norwegian	36	90,168
Nicaraguan	4	6,276
Panaman	3	2,004
Peruvian	1	6,848
Swedish	4	7,340
Spanish	1	4,461
Totals	290	1,142,350

There was also a considerable increase in the arrival of inland watercraft by the Mississippi River. Total arrivals of river craft of over 25 measurement tons were 294 vessels of 112,078 tons, an increase of 67 vessels and of 18,437 tons. There were 112 arrivals of Mississippi-Warrior vessels, 97 other barges, and 85 steamboats and other power vessels. There were 57 more barge arrivals than in the same month of 1928.

Vessel movements in the inner harbour navigation canal, connecting the Mississippi River and Lake Pontchartrain, amounted to 859 craft of all classes and to a tonnage of 350,608 for both directions during the month. This consisted of 164 Mississippi-Warrior vessels of 80,529 tons, 44 ocean steamships of 169,885 tons, and 651 miscellaneous craft of 100,194 tons.

MR. W. J. SMITH APPOINTED REPRESENTATIVE AT CHICAGO.

The Board of Commissioners of the Port of New Orleans announce the appointment, effective September 1st, of Mr. W. J. Smith as assistant to the general manager in the Foreign Trade Department, assigned to the Chicago Solicitation Office as successor to Mr. William Allen, who recently resigned to become Western representative of the United States Lines.

Mr. Smith has been engaged in traffic and transportation work for 25 years. In the early stages of the recent war he was special assistant to Mr. H. M. Adams, head of the Inland Traffic Division of the War Department. He then was assigned to traffic duties with the Bureau of Aircraft Production, in charge of operations between Detroit and the Pacific Coast. After the Armistice he became first head of the Traffic Department of the U.S. Shipping Board at Washington, and was chief of the supervisors in charge of operations until he resigned to enter private business. Later he rejoined the Shipping Board, with the Solicitation Division, leaving that service three years ago again to associate himself with private steamship owners at New Orleans.

INTER-COASTAL TRADE.

The port of New Orleans led all ports of the Gulf of Mexico in inter-coastal trade via Panama with the States of the Pacific Coast during the calendar year 1928, according to statistics published by the Bureau of Research of the U.S. Shipping Board. Total shipments to and from New Orleans in the inter-coastal trade for the year amounted to 296,447 cargo tons of 2240 pounds, or 40 per cent. of the total inter-coastal trade of the Gulf. This was divided into 163,856 tons inbound and 132,591 tons outbound, a better balance of traffic than exhibited by the figures for any other major port.

The trade of New Orleans with the several ports of the West Coast was as follows, in tons:—San Diego, 1,124; Los Angeles, 90,153; San Francisco, 148,641; Astoria, 155; Portland, 22,118; St. Helena, 1,298; Longview, 1,729; Vancouver (Wn.), 750; Anacortes, 400; Bellingham, 1,251; Port Gamble, 619; Seattle, 24,974; Tacoma, 3,218.

Progress in Development of Canada's Hudson Bay Route.

Prepared by the Natural Resources Intelligence Service, in co-operation with the Department of Railways and Canals.

READY access to the sea has ever been considered a factor of vital importance to the economic welfare of any country. Ocean transportation bridges, at a comparatively low cost, the gulf that separates the producing and the consuming areas of the world. This fact, together with the geography of North America, is responsible for the Hudson Bay transportation scheme that is now being actively developed by the Canadian Government.

A glance at the map of Canada reveals the inland isolation of the great agricultural western plains. Between them and the Pacific Ocean lies the Rocky Mountain barrier. The Atlantic seaboard and Eastern Canada are cut off by the intervention of hundreds of miles of non-productive pre-Cambrian areas. Even the great St. Lawrence system of waterways is at best but an inadequate substitute for an ocean lane. But that great arm of the sea, Hudson Bay, cuts deeply into the northern interior of the country, and to its shores the Western Canadian producers have long cast hopeful eyes. In fact, it was by this way that many of the pioneer settlers of the West came.

Hudson Bay, including James Bay, which is a southerly extension, measures nearly 1,000 miles from north to south and 600 miles from east to west at its greatest breadth, the total area being about 576,000 square miles. James Bay itself is 250 miles from north to south and from 100 to 150 miles wide. Hudson Strait is the passage from the Atlantic Ocean to this great inland sea. It is about 500 miles in length and has an average width of over 100 miles.

The entrance to Hudson Strait is in approximate longitude 64° 30′ west, which is about the same as that of Moncton, New Brunswick, or of the St. Lawrence River at the west end of Anticosti Island. Churchill Harbour, which is located well to the extreme west shore of Hudson Bay, is in longitude 94° 30′ west, or almost due north of Kenora, Ontario, and the Lake of the Woods. Thus the natural geography of Canada has furnished an ocean port deeper within the heart of the country than the limit of navigation on the St. Lawrence waterways.

Between the agricultural plains of Western Canada and the shores of Hudson Bay lies a belt of country that until recent years has produced little but furs. If the Saskatchewan River be taken as the approximate limit of extensive agricultural pursuits in Manitoba, then the providing of an outlet to Hudson Bay would involve the building of a railway across this great stretch of apparently unproductive country. This, together with a widespread belief that the navigation of Hudson Strait and Hudson Bay on a commercial basis was not feasible led to much discussion as to the real advantage that Western Canada might hope to derive because of its nearness to salt water.

While the demand for a Hudson Bay outlet has been most insistent in recent years, it is no new idea. Old maps in the Department of Railways show the existence of paper projections to Hudson Bay when the present Canadian Pacific was also a line on paper only. From 1886 to 1908 the Canadian Statutes contained a standing offer of subsidy in the form of land grants to anyone who would undertake the construction of the line. In the latter year, legislation was provided to authorise the sale of public lands in the west to enable the country either to construct, or to pledge the credit of the country to construct, a publicly-owned railway to Hudson Bay. This legislation was in force until 1918, and produced approximately $20,000,000. This revenue was never set apart specifically for the purposes of the railway, but the public treasury has had the benefit of it. Western Canada thus feels that is has already provided a fair proportion of the outlay involved in the undertaking.

Plans for a Hudson Bay railroad assumed definite shape in 1910 when a branch line of the Canadian Northern Railway, now part of the Canadian National Railways, was completed from Hudson Bay Junction, on its Winnipeg-Prince Albert section, to The Pas, on the Saskatchewan River, and the building of a Government line from The Pas to Hudson Bay was authorised by Parliament. Work on the Hudson Bay Railroad was commenced the following year with Churchill as objective. The proposed route lay entirely to the north of Nelson River and measured 474 miles. A town site had been surveyed at Churchill in 1908 and it was confidently expected that this natural port would be developed in the course of a few years.

Before much progress had been made on the building of the railway, or any at Churchill other than surveys, the Government of the day decided to make Port Nelson the terminus of the road in place of Churchill. The location of the railroad was altered accordingly. The new survey crossed the Nelson River twice, at Manitou rapids and at Kettle rapids. The route was shortened by 50 miles, the total distance from The Pas to Port Nelson being 424 miles, but the developing of harbour facilities at the newly-selected port involved greater efforts than at Churchill.

The right of way was cleared and graded to Port Nelson and steel was laid, before the end of 1918 as far as Kettle Rapids, 332 miles from The Pas. A very substantial steel bridge of a single 1,000-ft. span was erected at this crossing of the Nelson. Expenditures on the building of the railway amounted to $14,000,000, and $6,000,000 was spent on port development at Nelson. Owing to the war and consequent lack of men and steel, operations were suspended before the project was completed, and for some years only part of the completed railway was kept in repair. A very limited service was maintained between The Pas and Pikwitonei at Mile 214.

In 1926, the work of completing the Hudson Bay Railway was actively resumed by the Government. During the eight year interval between the closing down of the work and the resumption of construction, nature had rendered useless much of the work that had gone into the line. The ties had rotted and required replacing; the right-of-way had been badly heaved by successive frosts, and embankments had settled. Before additional construction could be undertaken, it was necessary, therefore, to rehabilitate the entire mileage as formerly constructed. This was done by the construction forces of the Canadian National Railways, at the instance of the Department of Railways and Canals.

The resumption of work on the railway made it necessary either to confirm the choice of Nelson as the terminus of the road or reconsider the situation. In that connection, a special committee of the Senate had recommended that before making further important expenditures at Nelson a new and thorough examination into the relative merits of Churchill and Nelson should be made. No authority on harbour development had previously been consulted in relation to Hudson Bay ports, and Mr. Frederick Palmer, of Rendel, Palmer, and Tritton, London, England, was engaged by the Government to investigate the respective merits of the two ports. Concurrently, steps were taken to ascertain whether it was physically possible to construct a line to Churchill, doubt having been thrown on that possibility by engineers who had favoured the selection of Nelson.

After close investigation by competent engineers, it was found that it would be no more difficult to construct a line of railway to Churchill than to Nelson. In August, 1927, Mr. Palmer, together with the Minister of Railways and Canals and the chief officials of the Department, visited both places, and on their return Mr. Palmer reported that Churchill was undoubtedly the port to be selected as affording a real harbour in which shipping facilities could be provided in calm water, protected from all storms by the surrounding rocky cliffs. His report has been separately printed and is available in the Department. In it, Mr. Palmer has supplied estimated costs of corresponding accommodation at Nelson and Churchill which show that, including interest during the period of construction, the cost at Churchill will be less than one-third of what would be required to complete at Nelson. Even after adding the cost of the extra 87 miles of railway to Churchill, the cost of developing a port at the latter point would be only about one-half of the Nelson estimate. It was stated also that the time for the completion of the works at Churchill, namely, three years, was one-half of the time that would be required to provide the necessary works at Nelson; also, the annual charges including interest, operation and maintenance, would be about a million dollars greater at Nelson than at Churchill. An important consideration was the fact that approach to Nelson of vessels of 28-ft. draft would be limited to a brief period around high water at neap tides, unless much expenditure were incurred in dredging, whereas, at Churchill, accommodation could readily be provided to admit of 28-ft. draft vessels during 24 hours of each day.

In consequence of this recommendation by such an acknowledged authority on harbour problems, it was decided to extend the railway to Churchill and establish the Hudson Bay Railway terminal at that point, which, as a matter of fact, was the terminus named in the instructions to the engineers in charge of the original surveys of 20 years ago.

During the year (1928) good progress was made in the construction of the railway to Churchill, which leaves the original line at Mile 356. The grading and ditching of the Churchill extension was let to contract, while the track and station work is being taken care of by Canadian National construction forces. To March 31st, 1928, $20,780,247.91 had been expended on the line, since which date, up to November 30th, an additional $2,606,000 has been expended on the railway. To March 31st, 1928, $897,950.76 had been expended on the work at Churchill, and during the present fiscal year, to November 30th, the expenditure there has been $2,561,000, so that during the present year more than $5,000,000 have been spent on Hudson Bay railway and port development. It is estimated that when the expenditures on the line to Churchill are completed, the total cost will be about $28,500,000. This last named figure does not, of course, include the cost of ocean terminals.

At the peak of operations during the season 2,200 men were employed on the Hudson Bay railway, with equipment that included three steam shovels, a track-laying machine and 12 locomotives. The objective set on the extension was Mile 460, thus bringing the steel within 50 miles of Churchill. It is planned to have a workable line completed before the end of another year.

During the past summer about 16,000 tons of material were sent in by sea from Halifax and Sydney, and unloaded at Churchill. Two dipper dredges, "Churchill No. 1" and "Churchill No. 2," built at Montreal especially for the work, and a hopper barge, the "Chesterfield," built at Collingwood, Ontario, were delivered at Churchill late in September, and are now available, with the other equipment, for an early start on the work next year. A second hopper barge, acquired from the Department of Marine and Fisheries last year and taken to Port Nelson, was towed to Churchill, and added to the equipment. On the operations at Churchill, 349 men were employed during the season, and the work was materially expedited by the use of airplanes between Churchill and the end of steel. About 3,000 tons of coal are now available, and the establishment is well supplied with materials for prosecuting the work during the coming year.

A good deal of useful information in connection with the navigation of Hudson Bay and Strait was secured by an aerial expedition established by the Department of Marine and Fisheries at three points on Hudson Strait during 1927, and this aerial reconnaissance was continued until recently, when the members of the expedition, together with their equipment, returned safely to Ottawa. The report on this expedition is not yet available, though expected shortly. As a result of it steps will be taken by the Department of Marine to establish at stragetic points throughout the Strait modern aids to navigation, including direction-finding devices, which will be of invaluable assistance to navigators in those northern waters, and will add greatly to the navigating possibilities of the route.

Already the presence of minerals in stupendous quantities tributary to the main line of the Hudson Bay Railroad has been proved and resultant development undertakings have made necessary the building of a branch line to Flinflon. This branch runs northerly and north-westerly from a point about seven miles beyond The Pas. The total length is 88 miles. A contract has been let recently for an extension or off-shoot of this branch line to the Sherritt-Gordon mine, involving some 40 miles or so of additional construction. It is quite within the bounds of probability that other branch lines will be necessary before many years, as the mineral riches of the region are further uncovered. It is altogether probable that the Hudson Bay Railway in itself will prove a profitable factor in developing the hinterlands of Canada. Being a part of the Canadian National Railways system, it has direct connection with Winnipeg, Prince Albert and other western centres. Its northern terminus, The Pas, is 483 miles from Winnipeg.

The products of the West now reach the British market either by way of the Great Lakes and Eastern Canadian ports or by the Pacific ports and through the Panama Canal to Liverpool. By the latter route the distance from Edmonton to Liverpool is 10,701 miles, and from Calgary to Liverpool, 10,572 miles.

The advantage of the Hudson Bay project lies in the short rail haul involved, and the cool ocean trip, which is expected to be an advantage to the dairying and stock-raising industries. What the rail haul means may be inferred from the following figures showing the distance from principal prairie points to Churchill as compared with Montreal.

	Churchill All Rail. Miles	Montreal All Rail. Miles	Montreal, via Great Lakes Miles
Winnipeg ...	993	1,357	1,633
Portage la Prairie ...	938	1,412	1,689
Brandon ...	937	1,492	1,767
Regina ...	843	1,713	1,990
Moose Jaw ...	886	1,756	2,032
Saskatoon ...	847	1,828	2,133
Edmonton ...	1,146	2,158	2,464
Calgary ...	1,246	2,260	2,466

The distance from Churchill to Liverpool is 2,936 miles; from Montreal to Liverpool 2,760 miles; from Winnipeg to Liverpool, via Hudson Bay, the distance is, for most mid-West points, at least 500 miles less than via Montreal, and from Edmonton to Liverpool, eastbound, over 1,000 miles less than via the Great Lakes.

As a concrete illustration, it may be stated that the distance from Saskatoon to Fort William is 904 miles, and from Fort William, via the Great Lakes, to Liverpool, 3,974 miles—a total of 4,878 miles. By the Hudson Bay route the distance from Saskatoon to Churchill will be 847 miles, and from Churchill to Liverpool 2,936 miles—a total of 3,783 miles—or a saving by the Hudson Bay route of 1,095 miles, with 57 miles less rail haul.

Developments at Hull.

A Special Committee of the Hull City Council has been appointed to negotiate with the London and North-Eastern Railway Company for the acquisition of the Queen's Dock Estate at Hull. This small dock was built in 1775, and is thus one of the oldest enclosed docks in the country. For its construction and two other docks which followed at intervals of some years, the moats which surrounded the old town were utilised as well as the bricks and masonry of the old fortifications. At one time it gave accommodation to the Greenland Whale Fisheries, and with the other small docks in the centre of the city has been used by the "short" or Continental and coast-wise trades. With the advance in the size of steamers, the Queen's Dock has almost passed entirely out of use and is now chiefly used by new steam trawlers fitting-out.

The original proposal put forward by Sir Alfred Gelder was that an effort should be made to barter for the site of land known as the Western Reservation, that is, land reserved by the Hull Corporation, and lying between the Victoria and Alexandra Docks, but the London and North-Eastern Railway Company have intimated their unwillingness to do so. In this event other terms apparently would have to be arranged if the Corporation pursues its object. The proposal, if the dock be acquired, is to fill it in and lay the site out as an ornamental square with street improvements which would greatly facilitate traffic between the "old town," which is now only possible over bridges, and the "greater Hull" which has sprung up and grown to an enormous extent in the past half-century. The area of the site is approximately 50,000 square yards. An independent suggestion put forward is that instead of filling in the dock space it should be emptied of water and built over, the land and ground part to be used as a monster garage or parking place for motor traffic.

An amended scheme for the abolition of the level railway crossings at Hull has been put forward, and Sir Henry Maybury and Mr. F. Palmer have been appointed expert advisers to the Hull Corporation at a fee of 5,000 guineas and £1,000 out of pocket expenses. As compared with the 1925 scheme there will be a saving in the estimated cost of £34,350 if the present proposals are accepted. These include the abolition of ten level crossings and the carrying of the railway on the high level, this being assisted in cases by the lowering of the level of the streets or roads by 3 or 4-ft. The estimated cost is £1,222,000, to which the London and North-Eastern Railway will contribute £100,000, the main cost being shared by the Corporation and the Government. A considerable part of the traffic to and from the docks passes over the existing level crossings, and rail and road transport is seriously handicapped by their continuance.

An important step in the direction of the development of Hull as an industrial centre has been taken within the past week or two by the selection of a site of 48 acres to the east of Hull for the erection of a paper mill by Mr. William Harrison, chairman of the Inveresk Paper Co., who has also extensive newspaper interests. Hull, of course, is admirably situated as a port for the importation of pulp from the Scandinavian countries. The new mills which are to be erected, it is expected, will give employment to 8,000 people when in full swing, and will not only make Hull one of the largest paper manufacturing centres in England, but in Europe. The site is on the Saltend Estate of the London and North-Eastern Railway Company, where Distillers, Ltd., have works for the manufacture of alcohol for chemical purposes and is designed to accommodate other industries which may be attracted to the port. On the part of it adjacent to the Humber the large petroleum importing companies have installations which are supplied by pipe-lines running along two jetties, at which tank steamers may moor and discharge at all states of the tide. The supply of water to the projected newsprint mill is to be provided by harnessing the water which now flows through the city in the agricultural drains, and an agreement has been made with the Commissioners who control them. This part of the arrangements involves the erection of a pumping station and reservoir at an estimated cost approaching a million sterling. The choice of Hull was largely influenced by the Hull Port Development Committee recently formed to push the unique advantages possessed by the Third Port.